VPDES PERMIT FACT SHEET

This document gives the pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a minor municipal permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-5 et seq. The discharge results from domestic sewage from the Tanglewood Home for Adults WWTP treated by a fixed film activated sludge system with chlorination and dechlorination. This permit action consists of adding nitrogen and phosphorus loading limits and revising the special conditions. (SIC Code: 4952)

1. **Facility Name and Address:**
   Tanglewood Home for Adults WWTP
   PO Box 808
   Covington, VA 24426
   Location: 4401 Midland Trail, Covington, VA (VA Route 661 in Callahan Community)

2. **Permit No: VA0090646** Current Permit Expiration Date: November 18, 2015

3. **Permit Contacts:**
   Ms. Nancy Jordan, Administrator, Tanglewood Home for Adults Inc., (540) 962-4967
   Mr. Brian White, Operator, Environmental Systems Service, LTD, (540) 862-5138; brian-ess@lumnos.net

4. **Application Complete Date:** August 27, 2015
   Permit Drafted By: Becky L. France, Water Permit Writer
   Date: July 23, 2015 (Revised 8/19/15)
   DEQ Regional Office: Blue Ridge Regional Office - Roanoke
   Reviewer: Kevin A. Harlow, Water Permit Writer
   Date Reviewed: August 19, 2015
   Public Comment Period Dates: From 9/3/15 To 10/2/15

5. **Receiving Stream Classification:**

Receiving Stream:	Ogle Creek (River Mile: 1.8)		
Watershed:	VAW-I08R (Ogle Creek Watershed)		
River Basin:	James River, Upper		
River Subbasin:	NA		
Section:	12i		
Class:	IV		
Special Standards:	PWS		
7-Day, 10-Year Low Flow:	0 MGD	7-Day, 10-Year High Flow:	0 MGD
1-Day, 10-Year Low Flow:	0 MGD	1-Day, 10-Year High Flow:	0 MGD
30-Day, 5-Year Low Flow:	0 MGD	Harmonic Mean Flow:	0 MGD
Tidal:	No	303(d) Listed:	No

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements:** IV

7. **Reliability Class:** I

8. **Permit Characterization**:

( )	Private	( )	Interim Limits in Other Document
( )	Federal	( )	Possible Interstate Effect
( )	State		
( )	POTW		
(X)	PVOTW		

9. **Wastewater Treatment System:** A description of the wastewater treatment system is provided below. See **Attachment B** for wastewater treatment schematics and **Attachment C** for a copy of the site visit report. Treatment units associated with the discharge are listed in the table below.

Table I
DISCHARGE DESCRIPTION

Outfall Number	Discharge Source	Treatment (Unit by Unit)	Flow (Design) (MGD)
001	Tanglewood Home for Adults WWTP	septic tanks pump station fixed film aeration basin (Biowheel) clarifier aerated sludge holding tank PEP filter chlorine feed chlorine contact piping dechlorination feed post aeration tank	0.018

The treatment works consist of an 18,000 gallon per day fixed film activated sludge treatment system. Following primary sedimentation and equalization, the wastewater is pumped to a fixed film activated sludge unit. Sludge from the treatment unit settles in a clarifier. Following sodium hypochlorite disinfection and sodium bisulfite dechlorination, the effluent gravity flows through a pipe across the road to Ogle Creek.

10. **Sewage Sludge Use or Disposal:** A VPDES Sewage Sludge Permit Application Form was submitted for this facility to address disposal of sewage sludge from the wastewater treatment

facility. Sludge is periodically pumped from the sludge holding tank and hauled to the Town of Covington WWTP.

11. **Discharge Location Description:** A USGS topographic map which indicates the proposed discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment D**. The permittee has an easement to allow discharge to Ogle Creek. The latitude and longitude of the proposed discharge is N 37°48'49", W 80°05'27".

Name of Topo: Callaghan Number: 160D

12. **Material Storage:** Sodium hypochlorite, sodium metabisulfite, and soda ash are stored in the locked wastewater treatment building.

13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, flow frequency data, STORET data, and any other biological and/or chemical data, etc.) are listed below.

Flow Frequency Data
Tanglewood Home for Adults WWTP discharges into the Ogle Creek Watershed (VAW-I08R). At a public hearing for the issuance in 2001, local residents testified that Ogle Creek typically goes dry during low flow conditions. These local observations suggested that low flow measurements predicted using a proportional drainage area with the downstream gauge were not indicative of stream flow on Ogle Creek due to local topographic and hydraulic conditions.

The DEQ Water Quality Assessment Group conducted four site specific measurements on Ogle Creek from May 31, 2001 to July 24, 2001. Some of the measurements were lower than the 1Q10 and 7Q10 flow frequencies estimated using the 1:1 relationship and flows at the gauge on Dunlap Creek did not approach the 7Q10 flow. Due to citizen testimony with photo documentation and direct flow measurements, this permit was written to reflect a 7Q10 of 0 MGD for Ogle Creek up to the nearest tributary, Thorny Branch. See **Attachment A** for a summary of the flow frequencies below the confluence with Thorny Branch. Flow frequencies were based upon proportional drainage areas from the gauge to the confluence with Thorny Branch and to the confluence with Johnson Creek. The critical flow values at the gauge stations have not been updated since 2005, and there have been only a slight increase in the 30Q5 and a slight increase in the high flow frequencies since the last permit reissuance.

Stream Water Quality Data
In 1996 a benthic study was completed at STORET Station 2-OGL004.32, located approximately 2.5 miles upstream of the discharge just below the confluence with Big Run. This assessment indicated a slightly impaired benthic community which was probably attributable to residential

construction activity in the area. In 2001 and 2002 STORET Station OGL005.53 was designated as an exceptional benthic community and habitat.

STORET Stations 2-OGL002.77 and 2-OGL000.23 are upstream and downstream of the discharge. Both water quality monitoring stations have been assessed as fully supporting the aquatic life use. Background pH and temperature data were very limited for Station 2-OGL002.77 with only three years of data during low flow conditions. STORET Station 2-DNP001.98 is located on Dunlap Creek approximately 2 miles below the confluence with Ogle Creek. The STORET Station on Dunlap Creek contains a much larger data set than the STORET Station data on Ogle Creek. So, the background temperature, pH, and hardness data were compiled for STORET Station 2-DNP001.98 and used in the wasteload allocations. The 90th percentile pH and temperature values were derived from data collected from January 2004 through November 2014. Mean hardness was derived from data collected from January 1995 to June 2001. **Attachment E** contains these STORET data.

Tanglewood Home for Adults discharges into the Ogle Creek Watershed (VAW-I04R). There are no impairments in this upper part of the watershed. However, there are four downstream impairments (PCBs, bacteria, benthic, and DO) in the Jackson River watershed.

The fish consumption use is impaired for approximately 12.43 miles of the Jackson River from the Covington water intake downstream to just above the Lowmoor community due to PCB contamination in fish tissue. A Total Maximum Daily Load (TMDL) study is scheduled for completion in 2020.

A 12.43 mile segment of the Jackson River from the Covington water intake downstream to just above the Lowmoor community is impaired for bacteria. A TMDL study is scheduled for completion in 2020.

The EPA approved a benthic TMDL (7/21/10) for the impaired section of the Jackson River (I0R-01-BEN) extending 24.18 miles of the Jackson River from Westvaco main processing outfall downstream to the confluence of Karnes Creek. This benthic TMDL report also evaluates the dissolved oxygen impairment in this same segment. Total nitrogen and phosphorus wasteload allocations have been assigned to point source dischargers in the watershed.

Endangered Species Evaluation

For the previous reissuance, the Department of Conservation and Recreation's Division of Natural Heritage (DCR) identified natural heritage resources in the project area. However, DCR did not believe that the discharge would adversely impact natural heritage resources. Also, the Virginia Department of Game and Inland Fisheries (VDGIF) commented that they did not believe there would be an adverse impact to the resources under their purview as long as the permittee complied with the effluent limitations of the permit. See **Attachment E** for a copy of DCR's and VDGIF's comments.

14. **Antidegradation Review and Comments**: Tier 1 **X (intermittent)** Tier 2 **X (perennial)** Tier 3 __

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. Ogle Creek in this segment (VAW-I08R) is not listed on Part I of the 303(d) list for exceeding the water quality criteria. Ogle Creek is determined to be a Tier 2 water, and no significant degradation of existing quality is allowed. This determination is based on the fact that the receiving stream is classified as a public water supply, and there are no data to indicate that this water is not better than the standards for all parameters that the Board has adopted criteria.

For purposes of aquatic life protection in Tier 2 waters, "significant degradation" means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, "significant degradation" means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. These antidegradation baselines are applied to the perennial stream section of Ogle Creek. The antidegradation baseline for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:
"WQS" = Numeric criterion listed in 9 VAC 25-260-5 et seq. for the parameter analyzed
"Existing quality" = Concentration of the parameter being analyzed in the receiving stream

Stream data and effluent data used to determine 90th percentile pH and temperature values for the antidegradation wasteload allocation spreadsheets are included in **Attachment E** and **Attachment F**, respectively. These "antidegradation baselines" become the new water quality criteria in Tier II waters and effluent limits for future expansions or new facilities must be written to maintain the antidegradation baselines for each pollutant. Antidegradation baselines have been calculated as described above and included in **Attachment G**.

This facility began discharging in 2003. An antidegradation evaluation for dissolved oxygen (DO), carbonaceous biochemical oxygen demand ($cBOD_5$), total kjeldahl nitrogen (TKN), pH, total residual chlorine (TRC), and ammonia as nitrogen limits has been completed. The DO, TKN, and $cBOD_5$ limits prevent a significant lowering of DO more than 0.20 mg/L from the existing level (90 percent DO saturation value) in the perennial section and maintain the water quality standard in the intermittent section. The pH is maintained within the range of 6.0 S.U. and 8.1 S.U. which is more stringent than the water quality criteria for the receiving stream. The ammonia as nitrogen and TRC limitations for the discharge have been established to prevent any significant lowering of water quality of the perennial stream at the confluence of Thorny Branch with Ogle Creek.

15. **Site Inspection:** Date: June 11, 2015 Performed by: Becky L. France
Attachment C contains a copy of the site visit memorandum. The last compliance and laboratory inspection was performed on December 10, 2014 by Chad H. Williams.

16. **Effluent Screening and Limitations Development:** DEQ Guidance Memorandum 00-2011 was used in developing all water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq). Refer to **Attachment G** for the antidegradation wasteload allocation spreadsheets and effluent limit calculations, and **Attachment H** for the regional water quality model output. See **Table II** on pages 19-20 for a summary of limits and monitoring requirements.

A. **Mixing Zone**

A mixing zone was not applicable to determining toxic limitations in the intermittent section. The MIXER program was run with the revised flows to determine the percentage of the receiving stream flow that could be used in the wasteload allocation calculations for the perennial section. The program output indicated that 100 percent of the 7Q10 and 100 percent of 1Q10 may be used for calculating acute and chronic antidegradation wasteload allocations (AWLAs). A copy of the print out from the MIXER run is enclosed in **Attachment G**.

B. **Effluent Limitations for Conventional Pollutants**

Flow -- The permitted design flow of 0.018 MGD for this facility is taken from the previous permit and the application for the reissuance. In accordance with the VPDES Permit Manual, flow is to be estimated and reported daily.

pH -- The pH limits of 6.0 S.U. minimum and 8.1 S.U. maximum have been carried forward from the previous permit. This range is more stringent than the Virginia Water Quality Standards (9 VAC 25-260-50), which is between 6.0 S.U. and 9.0 S.U. These

limits are based upon the best professional judgment (BPJ) of how the treatment process functions to remove ammonia.

The pH maximum limitation has been set to 8.1 S.U. to optimize nitrification and balance that against lower ammonia wasteload allocations generated from higher pH effluent. For the 2001 issuance permit, 90th percentile receiving stream data used in the calculation of an ammonia wasteload allocation was higher than 8.1 S.U. Limiting the maximum pH resulted in a higher ammonia wasteload allocation and ammonia limits which were more easily achieved. For this reissuance, effluent pH data were used to determine the 90th percentile value and this value was lower than 8.1 S.U. The facility adjusts alkalinity with soda ash to optimize nitrification. So, it is appropriate to continue the maximum 8.1 S.U. pH limit. In accordance with the current VPDES Permit Manual, grab sampling shall continue to be conducted daily.

E. coli -- During the permit term the permittee has exceeded the *E.* coli limits during 11 of the monitoring months (**Attachment F**). During some of these months there were also minimum TRC disinfection violations. The limits of 12.6 cfu/100 mL monthly average and 23.5 cfu/100 mL maximum have been continued from the previous permit. Grab samples shall be collected once per week between 8 AM and 4 PM.

These limits are a factor of ten lower than the Virginia Water Quality Standards. These low limits were first included in the 2001 issuance of the permit due to concerns of riparian landowners and the Virginia Department of Health (VDH) recommendation to include a safety factor to ensure public health protection. A copy of the VDH letter is found in **Attachment G**.

Total Suspended Solids (TSS) -- There were no exceedances of the TSS limits during the months of October 2011 through January 2015 (**Attachment F**). The TSS limits of 30 mg/L (2000 g/d) monthly average and 45 mg/L (3000 g/d) weekly average were required in accordance with federal technology-based guidelines, 40 CFR Part 133.102, for secondary treatment. These limits are the same as the previous permit. Grab samples shall continue to be collected once per month.

Carbonaceous Biochemical Oxygen Demand ($cBOD_5$), Dissolved Oxygen (DO), Total Kjeldahl Nitrogen (TKN) -- There were no exceedances of the $cBOD_5$ or DO limits during the months of October 2011 through January 2015 (**Attachment F**). There were exceedances of the TKN limits in November 2014. For the issuance, the Regional Water Quality Model for Free Flowing Streams, Version 4.0 was used to evaluate the effects of the discharge on the dissolved oxygen levels in the receiving stream. The $cBOD_5$, DO, and TKN limits were tiered for low flow summer months and high flow winter months.

STORET monitoring station 2-DNP001.98 is located on Dunlap Creek approximately 2 miles below the confluence with Ogle Creek. Since the 90th percentile stream temperature values have changed since the reissuance, the model output has been reevaluated. For the reissuance, data collected at this station from 2004 to 2014 were used to set the receiving stream's 90th percentile for the low flow temperature tier at 24.2 °C and the low flow temperature tier at 12.6 °C. The 90th percentile stream temperatures were also used for the effluent temperature data. The treatment facility is located in a building, and in the winter the effluent leaving the building will generally have a higher temperature than the receiving stream. However, the effluent will cool as it flows through the pipe which runs under the road to the receiving stream. Therefore, the stream temperatures from the STORET monitoring station 2-DNP001.98 have been used to determine the 90th percentile effluent temperature.

Two stream segments were evaluated for BOD_5, TKN, and DO limits needed to comply with water quality standards and prevent degradation to this Tier II water. The first stream segment, an approximately 1 mile intermittent segment following the discharge, must meet the DO water quality criteria (5.0 mg/L) in 9 VAC 25-260-50 for Class IV receiving waters. The second stream segment is a perennial section that is classified as a Tier 2 water. No significant lowering (0.20 mg/L) of water quality in the perennial section is allowed by the discharge.

The revised temperature data have been input into the Regional Water Quality Model for Free Flowing Steams (Version 4.0). The output indicated that during the low flow months of June through December limitations of 15 mg/L monthly average for $cBOD_5$; 5.1 mg/L monthly average for TKN; and 6.5 mg/L (minimum) for DO are protective to meet the DO water quality standard and prevent significant degradation of the existing perennial section's water quality. These model output limits have been continued from the previous reissuance. In accordance with Agency guidance, the weekly average $cBOD_5$ was derived by multiplying 1.5 times the monthly average limit. This weekly average calculation of 22.5 mg/L was rounded to 22 mg/L to comply with Guidance Memo 06-2016 which indicates that BOD_5 should be given as two significant figures.

During the high flow months of January through May, limitations of 24 mg/L monthly average for $cBOD_5$; 9.0 mg/L monthly average for TKN; and 5.6 mg/L (minimum) for DO were protective of the DO water quality standard and prevent any significant lowering of the water quality in the perennial receiving stream. The TKN, DO, and $cBOD_5$ limits have been continued from the previous reissuance.

Monthly grab sampling for $cBOD_5$ and TKN and daily monitoring for DO have been continued from the previous permit. **Attachment H** contains the water quality model outputs and the assumptions used to set these limits.

Oil and Grease -- For the 2006 reissuance application one of the four oil and grease data points was somewhat elevated (14 mg/L) and additional monitoring was required. From November 2006 through October 2010 there were no elevated oil and grease data and quarterly oil and grease monitoring was discontinued with the 2011 permit reissuance. No oil and grease monitoring will be required for this permit. The permittee is expected to maintain best maintenance practices that are incorporated into the Operations and Maintenance Manual to prevent future oil and grease problems.

C. **Effluent Limitations for Toxic Pollutants**

Ammonia as Nitrogen -- There were two exceedances of the ammonia limits in November of 2014 (5.6 mg/L monthly average, 11.1 mg/L maximum). Since these exceedances, there have been no problems meeting the ammonia limits.

The need for ammonia limits has been reevaluated using revised water quality criteria. To calculate limitations for ammonia, an average concentration of 9.0 mg/L has been assumed for the effluent. The 90th percentile temperature and pH data from STORET monitoring station 2-DNP001.98 on Dunlap Creek were used to determine the wasteload allocations.

There are two stream segments following the discharge. Effluent discharged into the first intermittent stream segment must meet the water quality standards. Protection of existing water quality is relevant to the second segment of the stream identified as perennial. Effluent must not significantly degrade the stream where the perennial flow begins. To protect the perennial Tier 2 stream section from significant degradation, no more than 25 percent of the unused assimilative capacity is allocated for toxic criteria for the protection of aquatic life. In order to comply with this restriction, antidegradation baselines were established. Since no data exist for the stream, the existing background concentration of pollutants is assumed to be zero. Thus, baselines are equal to 25 percent of the criteria as listed in Virginia's Water Quality Standards (9 VAC 25-260-00 et seq).

The acute and chronic wasteload allocations (WLAs) for the intermittent section and the acute and chronic antidegradation wasteload allocations (AWLAs) were calculated and the lower wasteload allocations were entered into the STATS program to determine if ammonia limits were needed. For the low flow months, the acute AWLA for the perennial section (19 mg/L) was lower than the acute WLA for the intermittent section. The chronic WLA for the intermittent section (2.5 mg/L) was lower than the chronic AWLA for the perennial section. So, for the low flow months 19 mg/L (acute) and 2.5 mg/L (chronic) were entered into the STATS program to determine if ammonia limits were needed. The STATS program determined that for low flow months, ammonia as effluent limitations of 5.1 mg/L monthly average and 5.1 mg/L weekly average were needed. Since the revised water quality criteria are less stringent, the previous permit

limitations are more stringent than the new STATS program output. To avoid backsliding, the more stringent permit limitations of 1.6 mg/L monthly average and 1.6 mg/L weekly average have been continued from the previous permit. Monthly grab sampling has been continued from the previous permit.

For the high flow months, the acute WLA for the intermittent section (23 mg/L) was lower than the acute AWLA for the perennial section. The chronic WLA (4.7 mg/L) for the intermittent section was lower than the chronic AWLA for the perennial section. The STATS program determined that for high flow months, ammonia effluent limitations of 9.5 mg/L monthly average and 9.5 mg/L weekly average were needed. Since the revised water quality criteria are less stringent, the previous permit limitations are more stringent than the new STATS program output. To avoid backsliding, the more stringent permit limitations of 2.1 mg/L monthly average and 2.1 mg/L weekly average have been continued from the previous permit. Monthly grab sampling has been continued from the previous permit. **Attachment G** contains the spreadsheets used to calculate the stream standards and wasteload allocations and the results of the reasonable potential determination for ammonia (STATS program).

Total Residual Chlorine (TRC) -- Antidegradation wasteload allocations (AWLAs) have been established for TRC to protect the perennial receiving stream from degradation. Since no data exists for the Tier 2 perennial section, the baseline is equal to 25 percent of the criterion. The WLAs in the intermittent section were lower than the AWLAs in the perennial section, so limits derived from the WLAs are sufficient to prevent significant degradation in the perennial section. Tiered limits are not necessary for this parameter.

Based on the WLAs and the Agency's STATS program, permit limits of 0.007 mg/L monthly average and 0.009 mg/L weekly average have been continued from the previous permit. Daily grab sampling has been continued from the previous permit.

Total Phosphorus, Total Nitrogen -- A section of the Jackson River downstream of the discharge point has been designed as impaired due to benthic life assessments. Total Maximum Daily Load (TMDL) allocations have been approved for total nitrogen and total phosphorus. Nitrogen and phosphorus wasteload allocations for the growing season have been assigned to all dischargers in the watershed. The growing season is defined in the TMDL as June – October. The growing season allocations for Tanglewood Home for Adults WWTP are 917.3 lb total nitrogen and 229.3 lb total phosphorus. The allocations are based on a discharge of 40 mg/L total nitrogen and 10 mg/L total phosphorus and the design flow of 0.018 MGD. The limitations are calculated for compliance on a seasonal basis annually from monthly monitoring. Monthly load calculations use a minimum of one grab sample. If more than one sample is taken in a month, a simple mean of all calculated loads shall be calculated. The resulting average daily load shall be multiplied

by the number of discharge days in the calendar month to calculate the total load for the month. A special condition has been included in Part I.D.11 with the specifics for calculating the limits from monitored data. See **Attachment E** for an excerpt from the Benthic TMDL for the Jackson River Watershed.

17. **Basis for Sludge Use and Disposal Requirements:** Since the facility pumps and hauls sludge to a POTW, there are no limits or monitoring requirements associated with sludge use or disposal beyond compliance with the Sludge Management Plan approved with the reissuance of the permit.

18. **Antibacksliding Statement:** Since there are no limitations less stringent than the previous permit, the permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.

19. **Compliance Schedules:** For this reissuance, there are no compliance schedules.

20. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. **Additional Total Residual Chlorine (TRC) Limitations and Monitoring Requirements (Part I.B)**

Rationale: This condition is required by the Sewage Collection and Treatment Regulations, 9 VAC 25-790. The permittee monitors the TRC concentration after chlorine contact. In accordance with 40 CFR 122.41(e), permittees are required, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. These requirements ensure proper operation of chlorination equipment to maintain adequate disinfection.

B. ***E. coli*** **Reporting Requirements (Part I.C)**

Rationale: The Water Quality Standards, 9 VAC 25-260-170 establishes bacteria water quality standards. The standard sets bacteria monitoring requirements. This special condition is needed to describe requirements for when there is insufficient data (four samples) to calculate a monthly geometric mean.

C. **95% Capacity Reopener (Part I.D.1)**

Rationale: This condition requires that the permittee address problems resulting from high influent flows, in a timely fashion, to avoid non-compliance and water quality problems from plant overloading. This condition is required by 9 VAC 25-31-200 B4 for all POTW and PVOTW permits.

D. **CTC, CTO Requirement (Part I.D.2)**

Rationale: This condition is required by Code of Virginia § 62.1-44.19 and the Sewage Collection and Treatment Regulations, 9 VAC 25-790.

E. **Operation and Maintenance Manual Requirement (Part I.D.3)**

Rationale: An Operations and Maintenance Manual is required by the Code of Virginia § 62.1-44.19, Sewage Collection and Treatment Regulations, 9 VAC 25-790, and 9 VAC 25-31-190E of the VPDES Permit Regulation.

F. **Licensed Operator Requirement (Part I.D.4)**

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C, Code of Virginia 54.1-2300 et seq., and Board for Waterworks and Wastewater Works Operators and Onsite Sewage System Professionals Regulations (18 VAC 160-20-10 et seq.) require licensure of operators. A Class IV operator is required for this facility.

G. **Reliability Class (Part I.D.5)**

Rationale: Reliability class designations are required by the Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities. Facilities are required to achieve a certain level of reliability to protect water quality and public health in the event of component or system failure. A Reliability Class I has been assigned to this facility.

H. **Closure Plan (Part I.D.6)**

Rationale: This condition establishes the requirement to submit a closure plan for the treatment works if the treatment facility is being replaced or expected to close. A closure plan is necessary to ensure treatment works are properly closed so that the risk of untreated wastewater discharge, spills, leaks, and exposure to raw materials is eliminated and water quality is maintained. The Code of Virginia § 62.1-44.21 requires every owner to furnish when requested plans, specifications, and other pertinent information as may be necessary to determine the effect of the wastes from this discharge on the quality of state waters, or such other information as may be necessary to accomplish the purpose of the State Water Control Law.

I. **Sludge Reopener (Part I.D.7)**

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage to allow incorporation

of any applicable standard for sewage sludge use or disposal promulgated under Section 405(d) of the Clean Water Act.

J. **Sludge Use and Disposal (Part I.D.8)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B2; and 420 and 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal. This special condition, in accordance with Guidance Memorandum No. 97-004, clarifies that the Sludge Management Plan approved with the reissuance of this permit is an enforceable condition of the permit.

K. **Total Maximum Daily Load (TMDL) Reopener (Part I.D.9)**

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

L. **Compliance Reporting (Part I.D.10)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220 I, this condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

M. **Nutrient Reporting Calculations (Part I.D.11)**

Rationale: This special condition provides instructions for calculation of the seasonal nitrogen and phosphorus loading limits which will be compared to the Total Maximum Daily Load approved by the EPA.

N. **Permit Application Requirement (Part I.D.12)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100.D and 40 CFR 122.21(d)(1) require submission of a new application at least 180 days prior to expiration of the

existing permit. In addition, the VPDES Permit Regulation, 9 VAC 25-31-100 E.1 and 40 CFR 122.21 (e)(1) note that a permit shall not be issued before receiving a complete application.

O. **Conditions Applicable to All VPDES Permits (Part II)**

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. **Changes to the Permit**

A. **Special conditions that have been modified from the previous permit are listed below: (The referenced permit sections are for the new permit.)**

1. The Additional Total Residual Chlorine Limitations and Monitoring Requirements Special Condition (Part I.B) has been modified to reflect changes in the Water Quality Standards.

2. The Operation and Maintenance Manual Requirement Special Condition (Part I.D.3) has been modified to reflect current VPDES Permit Manual recommendations.

3. The Compliance Reporting Special Condition (Part I.D.10) has been modified to include information about significant figures.

4. A Nutrient Reporting Special Condition (Part I.D.11) has been added to provide instructions for calculating nitrogen and phosphorus loadings for Part I.A.

5. A Permit Application Requirement Special Condition (Part I.D.12) has been added to provide the specific due date for the required submittal of the application.

6. Part II has been modified to include a requirement that all analysis be in accordance the Certification for Noncommercial Environmental Laboratories or Accreditation for Commercial Environmental Laboratories.

B. **New special conditions added to the permit are listed below:**

1. An *E. coli* Monitoring Requirements (Part I.C) has been added to comply with the Water Quality Standards 9 VAC 25-260-170 for when there are insufficient data (four samples) to calculate a monthly geometric mean.

2. A Nutrient Reporting Calculations Special Condition (Part I.D.11) has been added to directions calculating the nutrient TMDLs.

3. A Permit Application Requirement Special Condition (Part I.D.12) has been added to provide the specific due date for the required submittal of the application.

C. **Permit Limits and Monitoring Requirements:** See Table III on page 21 for changes to the effluent limits and monitoring requirements.

22. **Variances/Alternate Limits or Conditions:** No variances or alternate limits or conditions are included in this permit.

An application testing waiver was requested that grab BOD_5 and TSS data collected during the permit term be used in lieu of the application requirement for 24-hour composite samples. These items were not considered necessary to the permit reissuance. Therefore, these waivers were granted.

23. **Regulation of Treatment Works Users:** VPDES Permit Regulation 9 VAC 25-31-280 B9 requires that every permit issued to a treatment works owned by a person other than a state or municipality provide an explanation of the Board's decision on the regulation of users. There are no industrial users contributing to the treatment works.

24. **Public Notice Information required by 9 VAC 25-31-280 B:**

All pertinent information is on file and may be inspected, and copied by contacting Becky L. France at:

Virginia DEQ
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
becky.france@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for the comments. Only those comments received within the period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public

hearings shall state (1) the reason why a hearing is requested; (2) a brief informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and (3) specific references, where possible, to terms and conditions of the permit with suggested revisions.

Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the Blue Ridge Regional Office in Roanoke by appointment. A copy of the public notice is found in **Attachment I**.

25. **303(d) Listed Segments (TMDL):** This facility discharges directly to Ogle Creek. The stream segment receiving the effluent is not listed on the current 303(d) list; and therefore no Total Maximum Daily Loads (TMDLs) have been or are being developed for this segment. There are no impairments in this upper part of the watershed. However, there are four downstream impairments (PCBs, bacteria, benthic, and DO) in the Jackson River watershed.

The fish consumption use is impaired for approximately 12.43 miles of the Jackson River from the Covington water intake downstream to just above the Lowmoor community due to PCB contamination in fish tissue. A Total Maximum Daily Load study is scheduled for completion in 2020. Tanglewood Home for Adults WWTP submitted with the reissuance application an exception request from PCB monitoring per Guidance Memo 09-2001. The request is granted and PCB monitoring for TMDL development is not included in this permit.

A 12.43 mile segment of the Jackson River from the Covington water intake downstream to just above the Lowmoor community is impaired for bacteria. A TMDL is scheduled for completion in 2020.

The *Benthic TMDL Development for the Jackson River, Virginia* report was approved by EPA on July 21, 2010 and the State Water Control Board on December 9, 2010. The impaired segment (I09R-01-BEN) of the Jackson River extends 21.14 miles from the Westvaco main processing outfall downstream to the confluence of Karnes Creek. This benthic TMDL report also address the dissolved oxygen impairment in this same segment. The report includes a nitrogen wasteload allocation (917.3 lb) and a phosphorus wasteload allocation (229.3 lb) for Tanglewood Home for Adults WWTP. These limits have been included in the Tanglewood Home for Adults WWTP permit and are applicable during the growing season which the TMDL report defines as June through October.

26. **Additional Comments:**

A. **Reduced Effluent Monitoring:** In accordance with Guidance Memorandum 98-2005, all permit applications received after May 4, 1998, are considered for reduction in effluent monitoring frequency. Only facilities having exemplary operations that consistently meet permit requirements may qualify for reduced monitoring. To qualify for consideration of reduced monitoring requirements, the facility should not have been issued any Warning Letters, Notices of Unsatisfactory Laboratory Compliance, Letter of Noncompliance (LON) or Notices of Violation (NOV), or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

The facility received the following Warning Letters within the past three years:

Warning Letter No. W2012-07-W-1004	*E. coli* maximum limit exceeded 5/2012
Warning Letter No. W2012-08-W-1007	*E. coli* & TRC limits exceeded 6/2012
Warning Letter No. W2013-05-W-1005	*E. coli* & TRC limits exceeded 3/2013
Warning Letter No. W2013-07-W-1004	*E. coli* limit exceeded 5/2013
Warning Letter No. W2013-08-W-1008	*E. coli* limit exceeded 6/2013
Warning Letter No. W2013-09-W-0001	*E. coli* limit exceeded 7/2013
Warning Letter No. W2013-12-W-0001	*E. coli* limit exceeded 10/2013
Warning Letter No. W2014-12-W-1007	*E. coli* limit exceeded 10/2014
Warning Letter No. W2015-01-W-1008	*E. coli*, ammonia, TKN limits exceeded 10/2014

The facility does not meet the criteria discussed above, and therefore is not eligible for reduced monitoring.

B. **Previous Board Action:** On October 4, 2001, the State Water Control Board decided to issue the VPDES permit. There have been no further Board actions since the permit issuance.

On March 30, 2014, Tanglewood Home for Adults WWTP entered into a letter of agreement due to exceedances of the maximum *E. coli* limit. The permittee made operational changes to the system and the letter of agreement was terminated on April 27, 2015.

C. **Staff Comments:** The discharge is not controversial. The discharge is in conformance with existing TMDL planning documents for the area. The expiration date of the permit has been modified to allow the next effective date to begin with the first of the month.

D. **Public Comments:** No comments were received during the public comment period.

E. Tables

Table I	Discharge Description (Page 2)
Table II	Basis for Monitoring Requirements (Pages 19-20)
Table III	Permit Processing Change Sheet (Page 21)

F. Attachments

A. Flow Frequency Memorandum
B. Wastewater Schematics
C. Site Visit Report
D. USGS Topographic Map
E. Ambient Water Quality Information
- STORET Data (Station 2-DNP001.98)
- Benthic Data (Station 2-OGL004.32)
- Benthic TMDL for Jackson River (Excerpt)
- Endangered Species Information

F. Effluent Data
G. Wasteload and Limit Calculations
- Mixing Zone Calculations (MIXER 2.1)
- Wasteload Allocation Spreadsheets
- STATS Program Output (ammonia)
- VDH Letter Concerning *E. coli* Limits

H. Regional Water Quality Model (Version 4.0)
I. Public Notice

Table II-1
BASIS FOR LIMITATIONS – MUNICIPAL

( ) Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.018 MGD

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	1/Day	Estimated
pH (Standard Units)	2,3	NA	NA	6.0	8.1	1/Day	Grab
Total Suspended Solids	1	30 mg/L 2000 g/d	45 mg/L 3000 g/d	NA	NA	1/Month	Grab
Total Residual Chlorine	2	0.007 mg/L	0.009 mg/L	NA	NA	1/Day	Grab
Dissolved Oxygen (June – December)	2,4	NA	NA	6.5 mg/L	NA	1/Day	Grab
Dissolved Oxygen (January – May)	2,4	NA	NA	5.6 mg/L	NA	1/Day	Grab
E. coli	2	12.6 N/100 mL (Geometric Mean)	NA	NA	23.5 N/100 mL	1/Week	Grab
Ammonia as N (January – May)	2	2.1 mg/L	2.1 mg/L	NA	NA	1/Month	Grab
Ammonia as N (June-December)	2	1.6 mg/L	1.6 mg/L	NA	NA	1/Month	Grab
$cBOD_5$ (January – May)	4	24 mg/L 1600 g/d	36 mg/L 2400 g/d	NA	NA	1/Month	Grab
$cBOD_5$ (June – December)	4	15 mg/L 1000 g/d	22 mg/L 1500 g/d	NA	NA	1/Month	Grab
Total Kjeldahl Nitrogen (TKN) (June– December)	4	5.1 mg/L	7.6 mg/L	NA	NA	1/Month	Grab
Total Kjeldahl Nitrogen (TKN) (January – May)	4	9.0 mg/L	13.5 mg/L	NA	NA	1/Month	Grab

NA = Not Applicable NL = No Limitations; monitoring only

The basis for the limitations codes are:
1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Best Professional Judgment
4. Water Quality Regional Model
5. Jackson River Benthic TMDL

Table II -2
BASIS FOR LIMITATIONS – MUNICIPAL

( ) Interim Limitations
(x) Final Limitations

OUTFALL: 001
DESIGN CAPACITY: 0.018 MGD

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Total Nitrogen (TN) (June – Oct.)	5	NL mg/L	NA	NA	NA	1/Month	Grab
Total Phosphorus (TP) (June – Oct.)	5	NL mg/L	NA	NA	NA	1/Month	Grab
TN, monthly load (June – Oct.)	5	NL lb	NA	NA	NA	1/Month	Calculated
TP, monthly load (June – Oct.)	5	NL lb	NA	NA	NA	1/Month	Calculated
TN, total load (June – Oct.)	5	NA	NA	NA	917.3 lb	1/Year	Calculated
TP, total load (June – Oct.)	5	NA	NA	NA	229.3 lb	1/Year	Calculated

NA = Not Applicable NL = No Limitations; monitoring only

The basis for the limitations codes are:
1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Best Professional Judgment
4. Water Quality Regional Model
5. Jackson River Benthic TMDL

Table III-1
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Total Nitrogen (TN) (June – Oct.)	NA	1/Month			Monitoring needed to assess compliance with nitrogen wasteload allocation required by Jackson River TMDL.	3/11/15
001	Total Phosphorus (TP) (June – Oct.	NA	1/Month			Monitoring needed to assess compliance with phosphorus wasteload allocation required by Jackson River TMDL.	3/11/15
001	TN, monthly load (June – Oct.)	NA	1/Month			Monitoring needed to assess compliance with nitrogen wasteload allocation required by Jackson River TMDL.	3/11/15
001	TP, monthly load (June – Oct.)	NA	1/Month			Monitoring needed to assess compliance with phosphorus wasteload allocation required by Jackson River TMDL.	3/11/15
001	TN, total load (June – Oct.)	NA	1/Year	NA	917.3 lb total load	Monitoring needed to assess compliance with nitrogen wasteload allocation required by Jackson River TMDL.	3/11/15
001	TP, total load (June – Oct.)	NA	1/Year	NA	229.3 lb total load	Monitoring needed to assess compliance with phosphorus wasteload allocation required by Jackson River TMDL.	3/11/15

Attachment A

Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
3019 Peters Creek Road, Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Tanglewood Home for Adults WWTP - #VA0090646

TO: Permit File

FROM: Becky L. France, Water Permit Writer

DATE: March 12, 2015

Tanglewood Home for Adults WWTP discharges to Ogle Creek near Callaghan, Virginia. Flow frequencies are required at this site to develop effluent limitations for the VPDES permit.

Observations by local residents indicate Ogle Creek goes dry during low flow conditions. DEQ conducted site specific measurements above the Tanglewood site to verify low flow observations offered by the residents. Assuming Ogle Creek is dry at the discharge point during low flow conditions and becomes a perennial stream prior to its confluence with Dunlap Creek, estimates of the flow contributed by the major tributaries between the Tanglewood outfall and Dunlap Creek are needed. The flow contributed by Thorny Branch and Johnsons Creek, the two major tributaries, are provided below. The flow frequencies for these tributaries were determined using the USGS continuous record gauge on the Dunlap Creek near Covington, VA (#02013000) that has been operated since 1928. The gauge is located approximately 3.0 miles downstream of the Tanglewood discharge point, at the U.S. Highway 60 bridge near Covington, VA. The values for the tributaries have been determined using proportional drainage areas and do not address any withdrawals, discharges, or springs that may lie on them. The high flow months are January through May. The data for the reference gauge and the perennial points are presented in the attached tables.

Flow Frequency Determination: Tanglewood Home for Adults WWTP

Reference Gauge (data from 1929-2011)
Dunlap Creek near Covington, VA (#02013000)

Drainage Area [mi^2] = 162

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	10.1	6.5	High Flow 1Q10 =	22.0	14.2
7Q10 =	10.8	7.0	High Flow 7Q10 =	26.0	16.8
30Q5 =	14.3	9.2	HM =	44.0	28.4
30Q10=	12.9	8.3	High Flow 3010=	38.0	24.6

Flow frequencies at perennial point for the reissued permit
Johnsons Creek at mouth 12/5/05

Drainage Area [mi^2] = 10.5

	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	0.65	0.42	High Flow 1Q10 =	1.42	0.92
7Q10 =	0.70	0.45	High Flow 7Q10 =	1.68	1.08
30Q5 =	0.92	0.60	HM =	2.84	1.84
30Q10=	0.83	0.54	High Flow 30Q10=	2.45	1.59

Flow frequencies at perennial point for the reissued permit
Thorny Branch at mouth reissuance 11/19/15

Drainage Area [mi^2] = 2.6

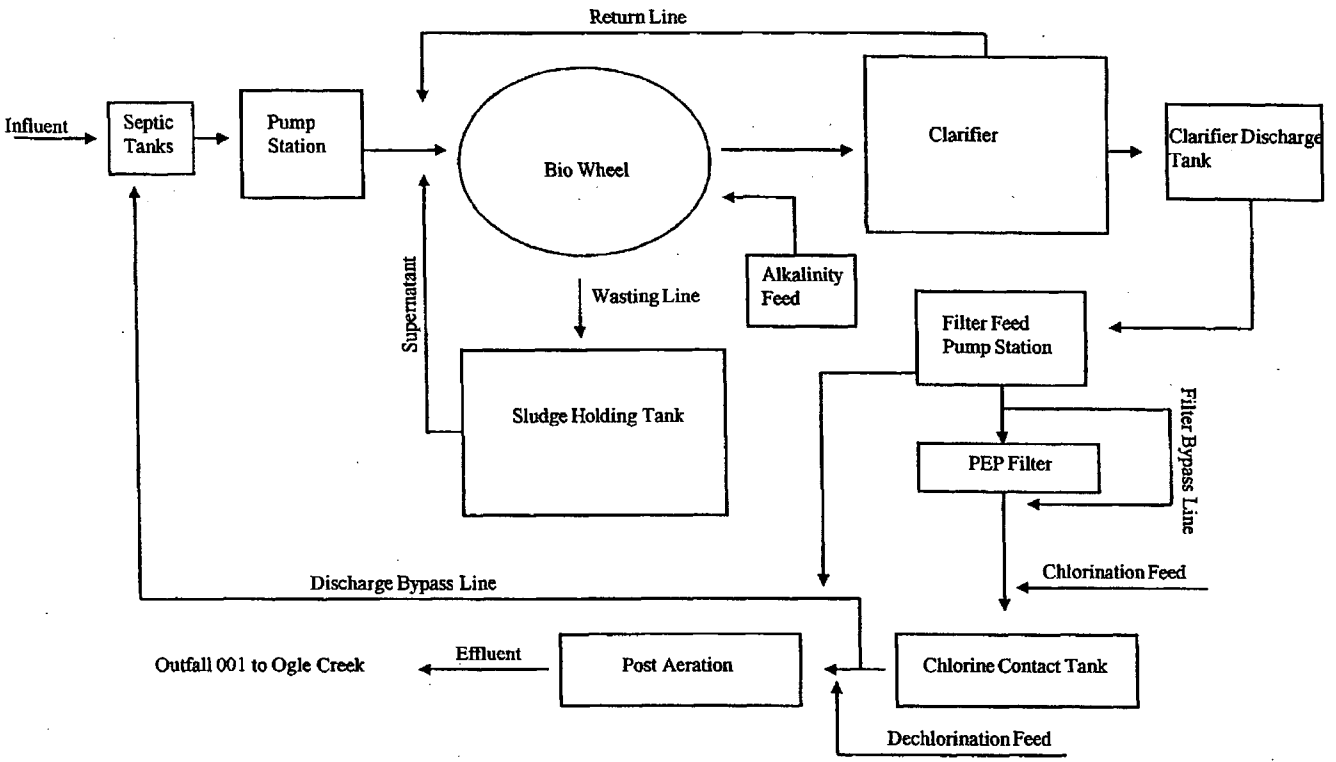
	ft^3/s	MGD		ft^3/s	MGD
1Q10 =	**0.16**	**0.10**	**High Flow 1Q10 =**	**0.35**	**0.23**
7Q10 =	**0.17**	**0.11**	**High Flow 7Q10 =**	**0.41**	**0.27**
30Q5 =	**0.23**	**0.15**	**HM =**	**0.70**	**0.45**
30Q10=	**0.20**	**0.13**	**High Flow 30Q10=**	**0.60**	**0.39**

SITEID	NAME	RECORD	River	LATLONG	DAAREA	HARMEAN	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HFMTHS	Statperiod	Yrstrn
02013000	Dunlap Creek near Covington, Va.	R, 1929-	James River	Lat 37 48'10", Long 80 02'49", NAD 83	162.0	44	38	26	22	14.3	12.9	10.8	10.1	8.8	JAN-MAY	1929-2011	2011

Attachment B

Wastewater Schematics

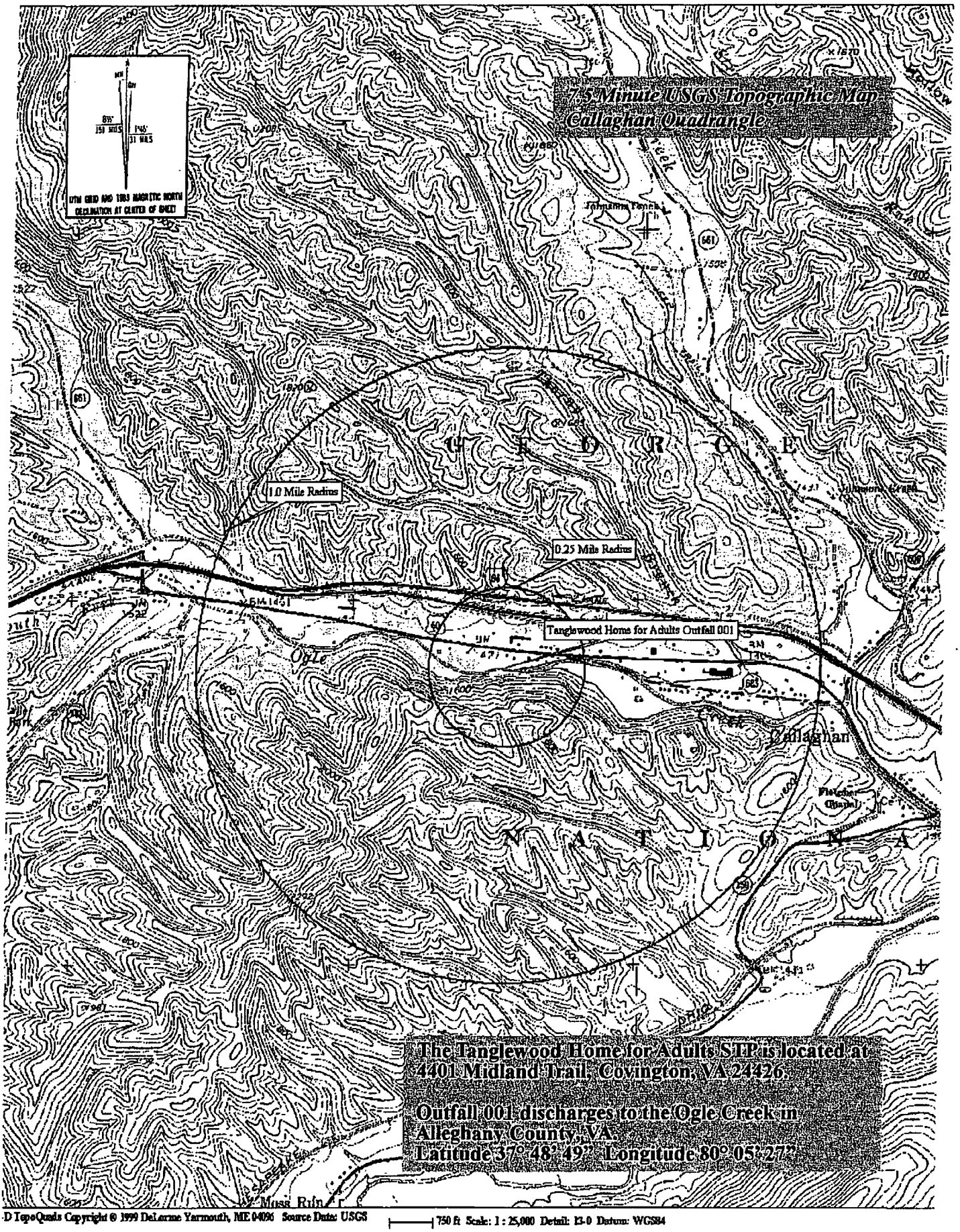
Flow Diagram of Tanglewood Adult Home
Wastewater Treatment Facility



Attachment Two

Attachment D

USGS Topographic Map



D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 750 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

Attachment One

Attachment C

Site Visit Report

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road Roanoke, VA 24019

SUBJECT: Site Visit Report for Tanglewood Home for Adults WWTP (VA0090646)

TO: Permit File

FROM: Becky L. France, Water Permit Writer

DATE: July 1, 2015

On June 11, 2015, a VPDES permit reissuance site visit was conducted at Tanglewood Home for Adults, Inc. Brian White, operator, was present at the inspection. The site is located approximately 5 miles west of Covington in the Callaghan community. The facility has a grease trap for the wastewater from the residents' cafeteria and four septic tanks. According to Mr. White the septage from the septic tanks and grease trap is pumped and hauled to a wastewater treatment facility about four times a year.

Plant Operations

A portion of the wastewater from the Tanglewood Home for Adults is routed through two parallel septic tanks in the front of the property to a pump station. The pump station has two submersible pumps which are float activated. The pump station has an audible alarm in the main building to warn the staff if the water level in the wet well rises due to a pump failure or other problem.

The remainder of the wastewater is routed to two serial septic tanks in the rear of the property with a submersible pump on the second tank. The facility has an onsite generator which is reportedly cycled once a week and tested monthly. In the event of a power failure, the treatment system motors need to be manually restarted.

Wastewater from these septic tanks is pumped to a 18,000 gpd wastewater treatment system located in a building. The wastewater is routed into a Bio-Wheel tank. The fixed film activated sludge treatment unit includes a nitrification step. At the time of the site visit, the activated sludge appeared a dark chocolate brown. To facilitate nitrification, the alkalinity of the tank is adjusted as needed with a manually added soda ash solution. Wastewater from the Bio-Wheel enters a clarifier through a port and is directed by a 12-inch stand pipe toward the bottom of the clarifier. The clarifier has a hopper and a sludge return airlift.

Sludge enters the sludge holding tank where it is mixed and aerated by air diffusers. Periodically sludge is hauled to a wastewater treatment facility. Sludge was last removed from the sludge holding tank a day before the site visit. Therefore, at the time of the site visit, there was no visible sludge blanket. The discharge from the clarifier appeared clear.

Wastewater from the clarifier can be filtered by a PEP HMF Series filter. Currently, the filter system is not being operated because it is not needed to meet the total suspended solids limits. The wastewater bypasses the filter to the

chlorination system. A sodium hypochlorite solution is injected into a closed 14-inch diameter chlorine contact pipe which is approximately 50 feet long. This pipe provides approximately 33 minutes of contact time at design flow.

Disinfected wastewater is dechlorinated by an injection of 3.9 percent sodium bisulfite solution. Then, the effluent is aerated by a Mazzai venturi device located prior to the pipe leading the outfall. If needed, the control valve may be closed further to force additional flow through the venturi device to increase the dissolved oxygen. Turbidity and flow are analyzed at this point. If a problem is noted with the effluent, the permittee can open a bypass line to route the effluent back to the septic tanks.

Location of Discharge/ Description of Receiving Waters

The effluent gravity flows through a pipe across the road to Ogle Creek. The permittee has an easement agreement to allow the permittee access to cross the neighboring property line to the outfall on Ogle Creek. The effluent is discharged into a silty section of the stream bed. The stream bed contains an assortment of rocks which range from large to gravel size, and there are trees growing near the bank. The stream channel is mostly straight but varies in stream width and depth over the course of the observed segment. According to Mr. White the facility discharges periodically in batches throughout the day. At the time of the site visit, the facility was not discharging. The stream was observed downstream of the discharge and there were no problems noted in the continuous stream flow.

Attachment E

Ambient Water Quality Information

- STORET Data (Station 2-DNP001.98)
- Benthic Data (Station 2-OGL004.32)
- Benthic TMDL for Jackson River (Excerpt)
- Endangered Species Information

VAW-I07R
2-DNP001.98 (Dunlap Creek 2 miles below confluence with Ogle Creek)

Collection Date Time	Temp Celsius	pH (S.U.)
1/12/2004 12:00	4.9	7.8
3/3/2004 11:00	7.5	7.7
5/4/2004 10:30	12	8
7/7/2004 11:30	23.6	7.9
9/15/2004 11:00	20	8.4
11/8/2004 12:00	11.45	7.2
1/11/2005 10:30	6.9	8
3/15/2005 11:00	5.3	8
5/2/2005 12:00	10.4	8
1/22/2009 13:30	0.4	7.9
3/11/2009 13:00	10.4	7.9
5/5/2009 14:00	12.6	7.3
7/7/2009 12:30	19.6	7.4
9/2/2009 13:30	22	7.9
11/30/2009 13:00	11.6	7.8
2/24/2010 12:00	4.6	7.7
4/1/2010 12:35	10.2	7.8
6/16/2010 13:30	25.4	8.1
8/17/2010 12:21	26	8.1
10/26/2010 12:30	14.7	8
12/29/2010 12:30	1.4	8
2/16/2011 10:15	4.8	7.8
4/19/2011 12:00	11.4	7.9
6/22/2011 10:45	22.4	7.8
8/16/2011 12:20	23.1	8
10/12/2011 14:55	16	8
12/28/2011 12:00	5.9	7.9
2/22/2012 12:35	4.9	7.6
3/8/2012 12:05	8.4	7.7
5/24/2012 13:00	15.8	8.2
7/5/2012 13:15	27.5	8.2
9/5/2012 13:35	24.6	8.2
11/27/2012 11:45	5.9	8
2/12/2013 10:15	5.9	7.9
4/2/2013 12:20	6.9	7.6
6/18/2013 11:45	19.1	7.9
8/13/2013 12:50	23.6	8
10/2/2013 13:00	19.3	7.9
12/16/2013 11:50	4.4	7.5
1/23/2014 10:30	0	7.5
3/18/2014 12:50	4.2	7.2
5/7/2014 11:50	16.7	7.8
7/2/2014 12:10	25.1	7.8
9/10/2014 11:50	21.02	7.99
11/6/2014 11:10	11.9	7.68

90th Percentile Temperature (Jan. -May)	12.6 °C
90th Percentile Temperature	24.2 °C
90th Percentile pH	8.1 S.U.
10th Percentile pH	7.5 S.U.

VAW-I07R
2-DNP001.98 (Dunlap Creek 2 miles below confluence with Ogle Creek)

Collection Date Time	Temp Celsius	pH (S.U.)
1/12/2004 12:00	4.9	7.8
3/3/2004 11:00	7.5	7.7
5/4/2004 10:30	12	8
7/7/2004 11:30	23.6	7.9
9/15/2004 11:00	20	8.4
11/8/2004 12:00	11.45	7.2
1/11/2005 10:30	6.9	8
3/15/2005 11:00	5.3	8
5/2/2005 12:00	10.4	8
1/22/2009 13:30	0.4	7.9
3/11/2009 13:00	10.4	7.9
5/5/2009 14:00	12.6	7.3
7/7/2009 12:30	19.6	7.4
9/2/2009 13:30	22	7.9
11/30/2009 13:00	11.6	7.8
2/24/2010 12:00	4.6	7.7
4/1/2010 12:35	10.2	7.8
6/16/2010 13:30	25.4	8.1
8/17/2010 12:21	26	8.1
10/26/2010 12:30	14.7	8
12/29/2010 12:30	1.4	8
2/16/2011 10:15	4.8	7.8
4/19/2011 12:00	11.4	7.9
6/22/2011 10:45	22.4	7.8
8/16/2011 12:20	23.1	8
10/12/2011 14:55	16	8
12/28/2011 12:00	5.9	7.9
2/22/2012 12:35	4.9	7.6
3/8/2012 12:05	8.4	7.7
5/24/2012 13:00	15.8	8.2
7/5/2012 13:15	27.5	8.2
9/5/2012 13:35	24.6	8.2
11/27/2012 11:45	5.9	8
2/12/2013 10:15	5.9	7.9
4/2/2013 12:20	6.9	7.6
6/18/2013 11:45	19.1	7.9
8/13/2013 12:50	23.6	8
10/2/2013 13:00	19.3	7.9
12/16/2013 11:50	4.4	7.5
1/23/2014 10:30	0	7.5
3/18/2014 12:50	4.2	7.2
5/7/2014 11:50	16.7	7.8
7/2/2014 12:10	25.1	7.8
9/10/2014 11:50	21.02	7.99
11/6/2014 11:10	11.9	7.68

90th Percentile Temperature (Jan. -May)	12.6 °C
90th Percentile Temperature	24.2 °C
90th Percentile pH	8.1 S.U.
10th Percentile pH	7.5 S.U.

Ogle Creek Physical, Chemical, and Habitat Data

OGL004.32
Sample Collection Date 6/4/1996

Habitat Metric		Score (0-20)
Instream cover		15
Embeddedness		15
Velocity/Depth regime		16
Channel alteration		18
Sediment deposition		8
Frequency of riffles		16
Channel flow status		18
Condition of banks		6
Bank veg. protection		18
Riparian zone width		16
Total		146

Station	Date		Temp	DO	pH	Cond
OGL004.32	6/4/1996		17.2	9.6	8	40

Ogle Creek Benthic Data

SampID	ORGRAN	Collect	Reference Yr	Taxa Rich	EPT Taxa	Tot. Indiv.	HBI	Dom. Family	% Dom. Family	% Chiro.	CLI	% Ephem.	% EPT (-Hydro.)	TotHabSc	% of Max (200)	BIOASSESSMENT
OGL004.32	WRO	6/4/1996	.	6	4	84	3.95	Ephemerellidae	73.8	0.0	.	90.5	92.9*	146	73.0	
MEO000.38	WRO	5/1/2000	MEO000.38	21	14	110	3.15	Ephemerellidae	24.5	0.0	REF	65.5	78.2	159	79.5	Non-impaired
JOB001.17	WRO	5/1/2000	JOB001.17	16	8	95	4.69	Simuliidae	42.1	6.3	REF	18.9	30.5*	NA	NA	Non-impaired
POT030.66	WRO	5/1/2000	POT030.66	17	9	112	3.71	Heptageniidae	25.9	8.0	REF	55.4	59.6	142	71.0	Non-impaired

* in *EPT (- Hydro.)* column means no Hydropsychidae were collected in sample.

Explanation of Metrics

Taxa Rich = total number of families in sample.

EPT Taxa = total number of Ephemeroptera (mayfly), Plecoptera (stonefly), and Trichoptera (caddisfly) Families in sample. Families in these Orders are typically regarded as being intolerant of pollution.

Tot. Indiv. = number of individual organisms in sample.

HBI = Hilsenhoff Biotic Index (modified). The weighted sum of total taxa by pollution tolerance. Lower is better (values > 5.5 typically indicate severely impaired benthic communities).

% Dom. Fam.: lower is better, indicates community diversity.

% Chironomidae: midge fly larvae. Combined Chironomidae (A) and (B). A's occur naturally in most streams. B's are the "bloodworms" and are found in degraded streams. A high abundance of either typically indicates degraded water quality.

CLI = Community Loss Index. Measurement of the loss of Families between reference station and the station of comparison. Values increase as the degree of dissimilarity from the reference station increases.

% Ephemeroptera = percent abundance of individual mayfly larvae. Higher values typically indicate better water quality; however, Ephemerellidae are tolerant of sedimentation.

% EPT (-Hydro.) = percent abundance of EPT individuals minus larvae from F. Hydropsychidae. Hydropsychidae larvae are semi-tolerant and can be very abundant in nutrient enriched streams.

TotHabSc = Total score for 10 habitat parameters. Each parameter has a maximum score of 20.

% of Max (200) = total habitat score divided by 200.

Taxa List for Ogle Creek

OGL004.32
Sample Collection Date 6/4/1996

Taxa		# collected
Cambaridae (crayfish)		2
Corydalidae (Dobsonfly larvae)		4
Ephemerellidae (Mayfly larvae)		62
Heptageniidae (Mayfly larvae)		10
Oligoneuridae (Mayfly larvae)		4
Philopotamidae (Caddisfly larvae)		2

Benthic TMDL Development for the Jackson River, Virginia

Submitted to

Virginia Department of Environmental Quality

Prepared by

THE Louis Berger Group, INC.
2445 M Street, NW
Washington, DC 20037

June 2010

Final Report

Executive Summary

Background

This report presents the development of the Jackson River benthic TMDL. The Jackson River originates in Highland County in southwestern Virginia, and extends to the confluence of the Jackson River with the Cowpasture River in Botetourt County, where the two rivers join to form the James River. The Jackson River flows through sections of Alleghany, Bath, Craig, and Highland Counties, as well as the Cities of Covington and Clifton Forge. The Gathright Dam regulates the stream flow in the Jackson River.

The impaired segment on the Jackson River is 24.21 total miles. It is listed for dissolved oxygen and General Standard benthic impairments (DEQ, 2004). The upstream limit of the impaired segment is below the Covington City Water Treatment Plant intake, and its downstream limit is at the confluence of the Jackson and Cowpasture Rivers. The impairments include the following:

- Dissolved oxygen impairment, extending from river mile 24.21 downstream to river mile 13.00 (11.21 miles of the impairment segment).
- General standard benthic impairment, extending from river mile 24.21 to river mile zero, which is the confluence of the Jackson River with the Cowpasture River (24.21 miles of the impairment segment).

Stressor Identification

The stressor identification for the biologically impaired segment of the Jackson River was performed using the available biological and water quality monitoring data. In addition, Discharge Monitoring Reports (DMR) and Nutrient Monitoring Reports (NMR); Toxicity Testing, Whole Effluent Toxicity (WET) data; and special studies were also used in the identification of the stressors on the Jackson River. The stressor identification follows guidelines outlined in the EPA Stressor Identification Guidance (EPA 2000).

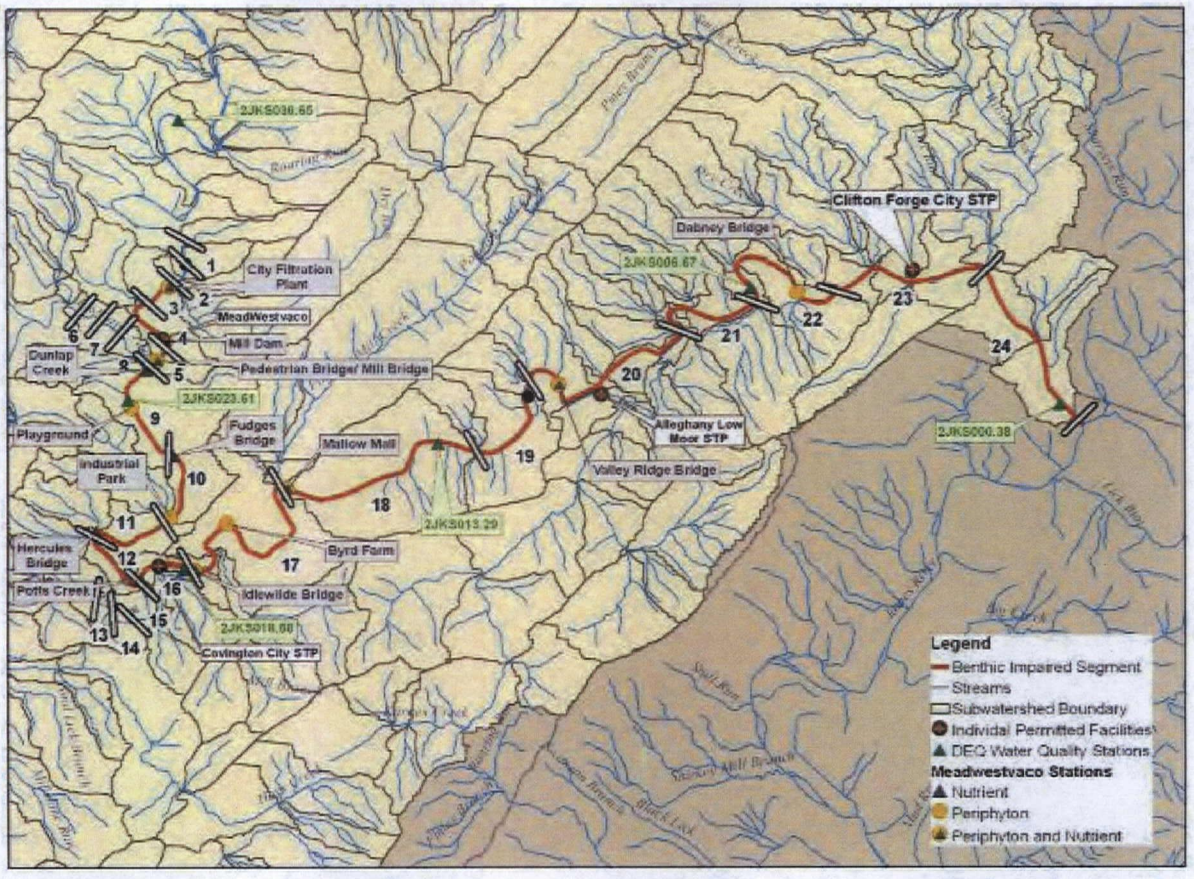


Figure E-1: Jackson River Model Segments

HSPF Model Description

The Hydrologic Simulation Program-Fortran (HSPF) was used to estimate the nutrient nonpoint source loads to the Jackson River. HSPF is a continuous, physically based, lumped-parameter model which simulates hydrology, sediment, and chemical pollutants in the soil and in streams. Nutrient simulation modules are detailed and flexible, and thus can be used to simulate a variety of land use types. The HSPF model is normally calibrated to observed flow and water quality data measured at the outlet of a watershed.

The Chesapeake Bay Program in Annapolis calibrated the HSPF Model over the entire Chesapeake Bay watershed. The model divides the 64,000 square mile Chesapeake Bay drainage basin into model segments. Each segment contains information generated by a

Table 2-6: Facilities Holding Active General Permits in the Jackson River Watershed

Permit Number	Facility Name	Permit Type	Receiving Waterbody	Status
VAR102964	Kim Stan Landfill Superfund Site Remedial Action	Stormwater Construction	Jackson River	Active
VAR050759	Alleghany Asphalt Plt – Lowmoor	Stormwater Industrial	Jackson River, UT	Active
VAR050765	Bennett Logging & Lumber Inc	Stormwater Industrial	Jackson River, UT	Active
VAR050713	Bradley Saw Mill Inc	Stormwater Industrial	Ogles Creek	Active
VAR051383	Clifton Forge Water Treatment Plant	Stormwater Industrial	Hazel Hollow	Active
VAR051361	Covington Wastewater Treatment Plant	Stormwater Industrial	Jackson River	Active
VAR050182	General Chemical LLC	Stormwater Industrial	Jackson River	Active
VAR050408	Kestersons Used Parts	Stormwater Industrial	Ogle Creek	Active
VAR050415	Lear Corp - Covington	Stormwater Industrial	Harmon Run	Active
VAR050440	Martin Co Coal Corp - Coal Handling Facility Inc	Stormwater Industrial	Jackson River	Active
VAR051392	Peters Mountain Landfill	Stormwater Industrial	Harmon Run	Active
VAR050393	Westvaco - Low Moor Converting Plant	Stormwater Industrial	Jackson River, UT	Active
VAG402026	Rothe, Martin Residence	Domestic Sewage	East Branch of Dry Creek	Active
VAG402094	Shirley Residence	Domestic Sewage	Anderson Hollow, UT	Active
VAG402098	Rogers Residence James O and Iris L	Domestic Sewage	Bens Run	Active
VAG840047	Boxley Materials Company - Alleghany Plant	Mines	Karnes Creek	Active
VAG842020	Boxley Materials Company - Alleghany Plant	Mines	Karnes Creek	Active
VAG110170	Cliftondale Redi Mix	Stormwater Concrete	Wilson Creek, UT	Active

7.4.3 Jackson River Load Allocation

The nonpoint sources modeling presented in **Chapter 6** resulted in an average PO4-P load during the growing season of 1,930 lbs. This corresponds to a TP load of 2,880 lbs during the growing season. Similarly, the nonpoint source modeling resulted to an average TN load of 24,160 lbs during the growing season. No reductions are applied to the nonpoint source loads.

7.4.4 Jackson River TMDL

A summary of the TMDL allocations for the Jackson River are presented in **Table 7-14 and Table 7-15** for total phosphorus and total nitrogen respectively. Section 7-4-5 provides the reasonable assurance that the Jackson River TMDL will be implemented through regulatory actions by Federal and State Agencies.

Table 7-14: Jackson River Total Phosphorus TMDL (lbs/growing season)

WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
72,955	2,880	Implicit	75,835

Table 7-15: Jackson River Total Nitrogen TMDL (lbs/growing season)

WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
220,134	24,160	Implicit	244,294

TMDL allocations expressed on a daily basis are presented in **Table 7-16 and Table 7-17** for total phosphorus and total nitrogen respectively. Since the Jackson River is dominated by the point sources loads with relatively constant discharge flow, the daily TMDL are estimated by dividing by 153 (number of days in the growing season) the growing season TMDL equations presented in **Tables 7-16 and 7-17**.

2.2 Permitted Discharge Facilities

There are 15 facilities holding active individual discharge permits in the Jackson River watershed. The permit number, type, permitted flow, receiving waterbody, and status of each of the facilities holding individual permits are presented in Table 2-5, and their locations are presented in Figure 2-4. There are also a total of 18 general permits in the Jackson River watershed; 11 stormwater permits issued to industrial sites, 3 permits issued to domestic sewage facilities, 2 permits issued to mines, 1 stormwater permit issued to a construction site, and 1 permit issued to a concrete facility. Additional information regarding the general permits is presented in Table 2-6.

Table 2-5: Facilities Holding Individual Permits in the Jackson River Watershed

Permit Number	Facility Name	Facility Type	Design Flow (gpd)[1]	Receiving Waterbody	Status
VA0027979	Alleghany County - Low Moor STP	Municipal	500,000	Jackson River	Active
VA0003450	Applied Extrusion Technologies	Industrial	1,000,000	Jackson River	Active
VA0088544	Boys Home Inc STP	Municipal	24,000	Dunlap Creek	Active
VA0022772	Clifton Forge City STP	Municipal	2,000,000	Jackson River	Active
VA0006076	Clifton Forge Water Treatment Plant	Industrial	50,000	Smith Creek	Active
VA0025542	Covington City STP	Municipal	3,000,000	Jackson River	Active
VA0003344	CSX Transportation Inc - Clifton Forge	Industrial	25,000	Jackson River	Active
VA0091324	DGIF Paint Bank Fish Cultural Station	Industrial	2,900,000	Paint Bank Branch	Active
VA0003646	MeadWestvaco Packaging Resource Group	Industrial	35,000,000	Jackson River	Active
VA0032115	Morris Hill STP	Municipal	15,000	Jackson River	Active
VA0002984	Parker Hannifin Powertrain Division	Industrial	208,000	Jackson River	Inactive
VA0088552	Sponaugle Subdivision	Municipal	16,000	Jackson River	Active
VA0090646	Tanglewood Manor Home for Adults	Municipal	18,000	Ogle Creek	Active
VA0075574	VDOT I64 Rest Area - Alleghany County	Municipal	15,000	Jerry's Run	Active
VA0090671	Alleghany Co - Lower Jackson River WWTP	Municipal	2,000,000	Jackson River	Inactive

1: Gallons per Day

7.4.1 Incorporation of Margin of Safety

The margin of safety (MOS) is a required component of the TMDL to account for any lack of knowledge concerning the relationship between effluent limitations and water quality. According to EPA guidance (*Guidance for Water Quality-Based Decisions: The TMDL Process, 1991*), the MOS can be incorporated into the TMDL using two methods:

- Implicitly incorporating the MOS using conservative model assumptions to develop allocations; or
- Explicitly specifying a portion of the TMDL as the MOS and using the remainder for allocations.

The MOS was implicitly incorporated into this TMDL using conservative target-setting assumptions. As described in Section 5-1, benthic chlorophyll levels in streams ranging from 100-150 mg/m^2 are considered excessive and at nuisance level. The Jackson River TMDL uses a conservative periphyton target of 100 mg/m^2, which is the low-end of the recommended "non-impaired' periphyton range of 100-150 mg/m^2. Therefore, the TMDL target in this TMDL is conservative eliminating the need for an explicit margin of safety.

7.4.2 Jackson River Waste Load Allocations

The basis for the development of the WLAs for the major dischargers was presented in Section 7.3 and consists of the following:

- **Implement the 6 flow pulses recommended under the 216 study.**
- **Assign to the WWTPs the reco mmended Chesapeake B ay discharge levels, (except the Low Moor w ater treatment plant) and assign the 2006 levels in terms of PO4-P discharge for the MeadWestvaco plant.**

Tables 7-7 and 7-8 present the major dischargers' WLAs for total phosphorus and total nitrogen respectively.

Table 7-7: Phosphorus Waste Load Allocations - Major Dischargers

Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Conc. (mg/L)	TP Load Allocation (lbs/growing season)	PO4-P Conc. (mg/L)	PO4-P Load Allocation (lbs/growing season)
MeadWestvaco	VA0003646	35	1.5	66,991	0.21*	9,379
Covington STP	VA0025542	3	0.5	1,914	0.335	1,282
Low Moor WWTP	VA0027979	0.3	1.15	440	0.7705	295
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659	0.335	1,111
			Total	**71,004**	-	**12,068**

*Measured as filtered orthophosphorus

Table 7-8: Total Nitrogen Waste Load Allocations During the Growing Season Major Dischargers

Facility Name	VPDES Permit	Discharge Flow (MGD)	TN Conc. (mg/L)	TN Load (lbs/growing season)
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
			Total	**213,478**

The allocation for Low Moor WWTP and Lower Jackson River WWTP reflect the aggregated mass load nutrient given to Alleghany County pursuant to 9VAC 25-820-70, Part 1.B.2, otherwise referred to as a "bubble". Accordingly, compliance is determined solely on an aggregate basis rather than by comparison of individual facility waste load allocations.

In addition to the major dischargers, there are 9 active minor facilities holding active individual discharge permits in the Jackson River watershed (4 industrial facilities and 5 municipal facilities). The 4 minor industrial facilities discharge very low level of nutrients. Based on DMR data for a few industrial facilities, the average discharge TP is approximated at 0.34 mg/L and 0.14 mg/l for total nitrogen and total phosphorus, respectively. **Table 7-9** presents the WLAs for the 4 minor industrial facilities for total phosphorus and total nitrogen respectively.

Table 7-9: Total Nitrogen and Total Phosphorus Waste Load Allocations – Minor Industrial Facilities

Permit Number	Facility Name	Design Flow (gpd)	TP Load (lbs/growing season)	TN Load (lbs/growing season)
VA0003450	Applied Extrusion Technologies	1,000,000	178.4	395.0
VA0006076	Clifton Forge Water Treatment Plant	50,000	8.9	19.7
VA0003344	CSX Transportation Inc - Clifton Forge	25,000	4.5	9.9
VA0091324	DGIF Paint Bank Fish Cultural Station	2,900,000	517.3	1145.4
		Total	**709**	**1,570**

The nutrient allocations for the 5 minor municipal dischargers are developed using recommended literature values related to primary treatment levels for total phosphorus (10 mg/L) and total nitrogen (40 mg/L) (Thomann, 1987). **Table 7-10** presents the WLAs for the 5 minor municipal facilities for total phosphorus and total nitrogen respectively.

Table 7-10: Total Phosphorus Waste Load Allocations – Minor Municipal Facilities

Permit Number	Facility Name	Design Flow (gpd)	TP (lbs/growing season)	TN (lbs/growing season)
VA0088544	Boys Home Inc STP	24,000	305.8	1223.1
VA0032115	Morris Hill STP	15,000	191.1	764.4
VA0088552	Sponaugle Subdivision	16,000	203.9	815.4
VA0090646	Tanglewood Manor Home for Adults	18,000	229.3	917.3
VA0075574	VDOT I64 Rest Area - Alleghany County	15,000	191.1	764.4
			1,121.2	**4,484.8**

There are also 18 general permits in the Jackson River watershed; 3 permits issued to domestic sewage facilities 11 stormwater permits issued to industrial sites, 2 permits issued to mines, 1 stormwater permit issued to a construction site, and 1 stormwater permit issued to a concrete facility.

The WLA for the domestic sewage facilities were developed using similar nutrient discharge assumption as the one used the minor municipal facilities along with a maximum discharge flow of 1,000 gallons per day. **Table 7-11** presents the total phosphorus and total nitrogen WLAs for the 3 domestic sewage facilities.

Table 7-11: Total Nitrogen and Total Phosphorus Waste Load Allocations Domestic Sewage Facilities

Permit Number	Facility Name	Design Flow (gpd)	TP Load (lbs/growing season)	TN Load (lbs/growing season)
VAG402026	Residence	1000	13	51
VAG402094	Residence	1000	13	51
VAG402098	Residence	1000	13	51
		Total	**39**	**153**

The remaining 15 general stormwater permits were lumped together for the estimation of the WLA. The following assumptions were used to develop the WLA for he general stormwater permits:

- The facilities consist of industrial land-use type
- The total acreage of all the general stormwater permits was estimated at 150 acres
- The average TP unit load is estimated at 1.46 kg/ha-year. (Terrene Institute and USEPA 1994)
- The average TN unit load is estimated at 8.0 kg/ha-year (Lin 2004)

Table 7-12 presents the nutrient WLAs for the general stormwater permits for total phosphorus and total nitrogen respectively.

Table 7-12: Total Nitrogen and Total phosphorus Waste load Allocations Stormwater General Permits

Number of General Stormwater Permits	Total Acreage (acres)	TP Load (lbs/growing season)	TN Load (lbs/growing season)
15	150	82	448
	Total	**82**	**448**

The recommended waste load allocations for each source within the watershed are summarized in **Table 7-13**.

Table 7-13: Summary of Recommended Waste Load Allocations in the Jackson River

Facility Name	Reference Tables in Report	TP Load (lbs/growing season)	PO4-P (lbs/growing season)	TN (lbs/growing season)
Major Point Source Dischargers	7-7 & 7-8	71,004	12,068	213,478
Minor Industrial Facilities	7-9	709		1,570
Minor Municipal Dischargers	7-10	1,121	-	4,484.8
Domestic Sewage Facilities	7-11	39	-	153
General Stormwater Permits	7-12	82	-	448
		72,955	**12,068**	**220,134**

Table E-3: Summary of Recommended Waste Load Allocations in the Jackson River

Facility Name	TP Load (lbs/growing season)	PO4-P (lbs/growing season)	TN (lbs/growing season)
Major Point Source Dischargers	71,004	12,068	213,478
Minor Municipal Dischargers	1,121	-	4,484.8
Minor Industrial Facilities	709		1,570
Domestic Sewage Facilities	39	-	153
General Stormwater Permits	82	-	448
Total	**72,955**	**12,068**	**220,134**

A summary of the TMDL allocation plan loads the Jackson River are presented in **Table E-4 and Table E-5** for total phosphorus and total nitrogen respectively.

Table E-4: Jackson River Total Phosphorus TMDL (lbs/growing Season)

WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
72,955	**2,880**	**Implicit**	**75,835**

Table E-5: Jackson River Total Nitrogen TMDL (lbs/growing Season)

WLA (Point Sources)	LA (Non-point sources)	MOS (Margin of Safety)	TMDL
220,134	**24,160**	**Implicit**	**244,294**

TMDL allocations expressed on a daily basis are presented in **Table E-6 and Table E-7** for total phosphorus and total nitrogen respectively. Since the Jackson River is dominated by the point sources loads with relatively constant discharge flow, the daily TMDL are estimated by dividing by 153 (number of days in the growing season) the growing season TMDL equations presented in **Tables E-4 and E-5**.

France, Becky (DEQ)

From: Aschenbach, Ernie (DGIF)
Sent: Monday, August 02, 2010 10:50 AM
To: France, Becky (DEQ); Daub, Elleanore (DEQ)
Cc: ProjectReview (DGIF)
Subject: FW: ESSLog# 31154; VPDES VA0090646 Permit re-issuance for Tanglewood Home for Adults WWTP in Covington, VA

We have reviewed the above-referenced VPDES permit re-issuance. According to the application for re-issuance, it proposes no new or increased discharges of pollutants. The existing treatment process uses chlorine for disinfection, post aeration, and dechlorination. We typically recommend using ultraviolet (UV) light disinfection rather than chlorination, in order to protect the overall health of the aquatic resources, including listed species. However, provided the applicant complies with the effluent limitations of the permit, we do not anticipate the renewal of this permit to result in adverse impact to resources under our purview.

Thank you for the opportunity to provide updated comments.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

France, Becky (DEQ)

From: nhreview (DCR)
Sent: Thursday, August 19, 2010 8:59 AM
To: France, Becky (DEQ)
Subject: VA0090646, Tanglewood Home for Adults WWTP
Attachments: 58571, DEQ #VA0090646, Tanglewood Home for Adults WWTP.doc

Ms. France,

Please find attached the DCR-DNH comments for the above referenced project. The comments are in word format and can be printed for your records. Also species rank information is available at http://www.dcr.virginia.gov/natural_heritage/help.shtml for your reference.

Please send a confirmation e-mail upon receipt of our comments. Let us know if you have any questions.

Thank you for your request.

In addition, the Virginia Natural Heritage Program is conducting a quick 10 question survey of individuals using our project review services. This survey is intended to gather basic information on the value and quality of the information and services provided by the Heritage Program. All information will be kept anonymous, unless you provide contact information for follow up. The information gathered will be used internally to improve the quality of our services to you. Please click on the link and begin the survey http://www.surveymonkey.com/s/883H2TP. Thank you in advance for your help!

S. Rene' Hypes
Project Review Coordinator
DCR-DNH
217 Governor Street
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
Rene.Hypes@dcr.virginia.gov

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

MEMORANDUM

DATE: August 19, 2010

TO: Becky France, DEQ-WCRO

FROM: Rene' Hypes, DCR-DNH

SUBJECT: #VA0090646, Tanglewood Home for Adults WWTP

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Thank you for the opportunity to comment on this project.

Attachment F

Effluent Data

Tanglewood Home for Adults
VA0090646

Tiered Limits (June - Dec.)

Date Due	Ammonia		TKN		$cBOD_5$				DO
	mg/L		mg/L		g/d		mg/L		mg/L
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Minimum
Limits	**1.6**	**1.6**	**5.1**	**7.6**	**1000**	**1500**	**15**	**22**	**6.5**
10-Nov-11	<QL	<QL	1.7	1.7	<QL	<QL	<QL	<QL	6.8
10-Dec-11	<QL	<QL	2.1	2.1	<QL	<QL	<QL	<QL	7.1
10-Jan-12	<QL	<QL	2.7	2.7	<QL	<QL	<QL	<QL	7.1
10-Jul-12	0.4	0.4	1.5	1.5	50	50	5	5	7
10-Aug-12	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	6.5
10-Sep-12	1.6	1.6	<QL	<QL	<QL	<QL	<QL	<QL	6.7
10-Oct-12	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	7.2
10-Nov-12	<QL	<QL	<QL	<QL	67	67	7	7	6.9
10-Dec-12	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	7.3
10-Jan-13	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	7.8
10-Jul-13	<QL	<QL	3	3	353	353	7	7	6.5
10-Aug-13	<QL	<QL	2.4	2.4	<QL	<QL	<QL	<QL	6.7
10-Sep-13	<QL	<QL	2.3	2.3	<QL	<QL	<QL	<QL	6.7
10-Oct-13	<QL	<QL	1.5	1.5	<QL	<QL	<QL	<QL	7.4
10-Nov-13	<QL	<QL	1.5	1.5	<QL	<QL	<QL	<QL	7.5
10-Dec-13	<QL	<QL	2.2	2.2	<QL	<QL	<QL	<QL	8.2
10-Jan-14	0.5	0.5	2.7	2.7	<QL	<QL	<QL	<QL	7.2
10-Jul-14	<QL	<QL	0.5	0.5	<QL	<QL	<QL	<QL	6.9
10-Aug-14	<QL	<QL	1.5	1.5	<QL	<QL	<QL	<QL	7.4
10-Sep-14	<QL	<QL	0.8	0.8	<QL	<QL	<QL	<QL	7.5
10-Oct-14	<QL	<QL	1.3	1.3	<QL	<QL	<QL	<QL	7.4
10-Nov-14	<QL	<QL	1	1	<QL	<QL	<QL	<QL	7.5
10-Dec-14	**5.6**	**11.1**	**8**	**14.2**	90	90	9	9	7.4
10-Jan-15	<QL	<QL	0.9	0.9	<QL	<QL	<QL	<QL	7.1

Tanglewood Home for Adults
VA0090646

Tiered Limits Jan. - May

Date Due	Ammonia		TKN		$cBOD_5$				DO
	mg/L		mg/L		g/d		mg/L		mg/L
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Minimum
Limits	**2.1**	**2.1**	**9**	**13.5**	**1600**	**2400**	**24**	**36**	**5.6**
10-Feb-12	1.6	1.6	2.2	2.2	106	106	6	6	7
10-Mar-12	<QL	<QL	1.3	1.3	<QL	<QL	<QL	<QL	6.9
10-Apr-12	<QL	<QL	1	1	<QL	<QL	<QL	<QL	6.9
10-May-12	<QL	<QL	2	3	<QL	<QL	<QL	<QL	6.9
10-Jun-12	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	7
10-Feb-13	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	8.7
10-Mar-13	<QL	<QL	1.2	1.2	<QL	<QL	<QL	<QL	7.9
10-Apr-13	<QL	<QL	0.5	0.5	<QL	<QL	<QL	<QL	7.8
10-May-13	<QL	<QL	2.1	2.1	<QL	<QL	<QL	<QL	6.8
10-Jun-13	<QL	<QL	1.9	1.9	221	221	6	6	6.5
10-Feb-14	0.7	0.7	2.8	2.8	<QL	<QL	<QL	<QL	8.7
10-Mar-14	<QL	<QL	1.6	1.6	<QL	<QL	<QL	<QL	8.6
10-Apr-14	<QL	<QL	2.7	2.7	<QL	<QL	<QL	<QL	7.9
10-May-14	<QL	<QL	3.1	3.1	32	32	5	5	7.8
10-Jun-14	<QL	<QL	<QL	<QL	<QL	<QL	<QL	<QL	7
10-Feb-15	<QL	<QL	1.1	1.1	<QL	<QL	<QL	<QL	7.7

Tanglewood Home for Adults
VA0090646

Date Due	Flow	*E. coli*		TRC		TSS			
	MGD	NCM./L		mg/L		g/d		mg/L	
	Average	Average	Maximum	total contact minimum	inst minimum	Average	Maximum	Average	Maximum
Limits	**0.018**	**12.6**	**23.5**	**1.5**	**0.6**	**2000**	**3000**	**30**	**45**
10-Nov-11	0.004	2.7	7.5	**1**	1.02	0.04	0.04	2	2
10-Dec-11	0.005	2	4.1	**1.1**	1.06	27	27	3	3
10-Jan-12	0.006	8.1	**231**	**1.3**	1.26	97	97	9	9
10-Feb-12	0.007	1	1	1.5	1.47	256	256	9	9
10-Mar-12	0.004	1.3	4.1	1.4	1.36	46	46	6	6
10-Apr-12	0.005	2.3	**29.5**	**1.2**	1.2	140	140	9	9
10-May-12	0.004	5.3	12.1	**1.2**	1.16	65	65	6	6
10-Jun-12	0.006	8.2	**2419.6**	**1.4**	1.39	76	76	4	4
10-Jul-12	0.003	2.3	**26.2**	**1.1**	1.1	291	291	29	29
10-Aug-12	0.002	1	1	**1**	1.02	20	20	2	2
10-Sep-12	0.002	1.9	12.1	**1.1**	1.1	19	19	3	3
10-Oct-12	0.004	1	1	**1.3**	1.32	24	24	2	2
10-Nov-12	0.003	1	1	**1.3**	1.3	92	92	10	10
10-Dec-12	0.003	2	7	**1.1**	1.12	38	38	2	2
10-Jan-13	0.003	1	1	**1.1**	1.08	20	20	2	2
10-Feb-13	0.004	1.1	2	**1.1**	1.1	17	17	3	3
10-Mar-13	0.004	1.2	2	**1.1**	1.1	25	25	1	1
10-Apr-13	0.005	7	**2420**	**1.1**	1.12	42	42	2	2
10-May-13	0.006	1	1	**1.2**	1.2	<QL	<QL	<QL	<QL
10-Jun-13	0.007	5.5	**921**	1.5	1.51	590	590	16	16
10-Jul-13	0.007	**18.7**	**30**	1.5	1.5	816	816	16	16
10-Aug-13	0.004	7	**1730**	**1.2**	1.2	89	89	10	10
10-Sep-13	0.003	1	1	1.5	1.5	60	60	4	4
10-Oct-13	0.002	1	1	1.5	1.5	<QL	<QL	<QL	<QL
10-Nov-13	0.002	4.5	**147**	1.8	1.8	24	24	3	3
10-Dec-13	0.003	1	1	1.6	1.6	53	53	6	6
10-Jan-14	0.004	1	1	1.5	1.5	43	43	2	2
10-Feb-14	0.004	1	1	1.5	1.5	43	43	3	3
10-Mar-14	0.007	1	1	1.6	1.6	37	37	1	1
10-Apr-14	0.004	1.6	7	1.6	1.6	52	52	5	5
10-May-14	0.003	1.6	6	1.5	1.5	78	78	12	12
10-Jun-14	0.004	1	1	1.6	1.6	27	27	2	2
10-Jul-14	0.004	1.2	2	**1**	1	62	62	4	4
10-Aug-14	0.004	1	1	1.6	1.6	41	41	4	4
10-Sep-14	0.005	2.3	26	**1.1**	1.1	22	22	2	2
10-Oct-14	0.005	1	1	1.6	1.6	29	29	3	3
10-Nov-14	0.003	7.8	**687**	1.5	1.5	6	6	2	2
10-Dec-14	0.002	**28.1**	**2420**	1.6	1.6	78	78	8	8
10-Jan-15	0.003	1	1	**1.3**	1.3	20	20	1	1
10-Feb-15	0.003	1	1	1.6	1.6	19	19	1	1

Tanglewood Home for Adults WWTP
VA0090646

Effluent pH (S.U.)

Date Due	min	max
10-Nov-11	6.1	7
10-Dec-11	6.2	7.2
10-Jan-12	6.2	7.1
10-Feb-12	6.2	7.1
10-Mar-12	6.1	7.1
10-Apr-12	6.1	7.1
10-May-12	6.1	7.3
10-Jun-12	6.2	7.1
10-Jul-12	6.2	7.1
10-Aug-12	6.1	7
10-Sep-12	6.1	7
10-Oct-12	6.1	7.1
10-Nov-12	6.2	7
10-Dec-12	6.1	6.8
10-Jan-13	6.2	7.1
10-Feb-13	6.1	7.6
10-Mar-13	6.2	7.2
10-Apr-13	6.3	7.2
10-May-13	6.2	7
10-Jun-13	6.3	7.3
10-Jul-13	6.3	7.1
10-Aug-13	6.1	6.9
10-Sep-13	6.1	6.8
10-Oct-13	6.1	7.1
10-Nov-13	6.1	7.1
10-Dec-13	6.2	7.3
10-Jan-14	6.7	7.6
10-Feb-14	6.7	7.4
10-Mar-14	6.8	7.3
10-Apr-14	6.4	7.2
10-May-14	6.1	7.3
10-Jun-14	6.1	7.4
10-Jul-14	6.8	7.4
10-Aug-14	6.5	7
10-Sep-14	6.7	7.3
10-Oct-14	6.5	7.2
10-Nov-14	6.1	7.8
10-Dec-14	6.2	7.4
10-Jan-15	6.3	7.1
10-Feb-15	6.1	6.9

90th Percentile pH	7.4	S.U.
10th Percentile pH	6.1	S.U.

Tanglewood Home for Adults WWTP
VPDES Permit No. VA0090646

Date Due	Oil and Grease (mg/L)
10-Dec-06	5.00
1-Feb-07	5.00
10-May-07	5.00
10-Aug-07	5.00
10-Oct-07	5.00
10-Jan-08	5.00
10-Mar-08	5.00
10-Jun-08	5.00
10-Sep-08	5.00
10-Dec-08	5.00
10-Mar-09	5.00
10-Jun-09	5.00
10-Sep-09	7.2
10-Dec-09	5.00
10-Mar-10	5.00
10-Jun-10	5.00
10-Sep-10	5.00

Attachment G

Wasteload and Limit Calculations

- Mixing Zone Calculations (MIXER 2.1)
- Wasteload Allocation Spreadsheets
- STATS Program Output (ammonia, TRC)
- VDH Letter Concerning *E. coli* Limits

Mixing Zone Predictions for Tanglewood Home for Adults (perennial - high flow)

Effluent Flow = 0.018 MGD
Stream 7Q10 = 0.27 MGD
Stream 30Q10 = 0.39 MGD
Stream 1Q10 = 0.23 MGD
Stream slope = 0.007 ft/ft
Stream width = 3.91 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .309 ft
Length = 27.68 ft
Velocity = .369 ft/sec
Residence Time = .0009 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .3858 ft
Length = 22.49 ft
Velocity = .4185 ft/sec
Residence Time = .0006 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .281 ft
Length = 30.21 ft
Velocity = .3494 ft/sec
Residence Time = .024 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Mixing Zone Predictions for Tanglewood Home for Adults (perennial - low flow)

Effluent Flow = 0.018 MGD
Stream 7Q10 = 0.11 MGD
Stream 30Q10 = 0.13 MGD
Stream 1Q10 = 0.10 MGD
Stream slope = 0.007 ft/ft
Stream width = 2.68 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2399 ft
Length = 15.87 ft
Velocity = .3081 ft/sec
Residence Time = .0006 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2633 ft
Length = 14.53 ft
Velocity = .3246 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2273 ft
Length = 16.71 ft
Velocity = .2992 ft/sec
Residence Time = .0155 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Tanglewood Home for Adults WWTP Permit No.: VA0090646

Receiving Stream: Ogle Creek - intermittent Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		
Mean Hardness (as CaCO3) =	126	mg/L
90% Temperature (Annual) =	24.2	deg C
90% Temperature (Wet season) =	12.6	deg C
90% Maximum pH =	8.1	SU
10% Maximum pH =	7.5	SU
Tier Designation (1 or 2) =	1	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	0	MGD
7Q10 (Annual) =	0	MGD
30Q10 (Annual) =	0	MGD
1Q10 (Wet season) =	0	MGD
30Q10 (Wet season)	0	MGD
30Q5 =	0	MGD
Harmonic Mean =	0	MGD

Mixing Information		
Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	126	mg/L
90% Temp (Annual) =	24.2	deg C
90% Temp (Wet season) =	12.6	deg C
90% Maximum pH =	7.4	SU
10% Maximum pH =	6.1	SU
Discharge Flow =	0.015	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	6.7E+02	9.9E+02	--	--	6.7E+02	9.9E+02	--	--	--	--	--	--	--	--	**--**	**--**	**6.7E+02**	**9.9E+02**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.1E+00	9.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**6.1E+00**	**9.3E+00**
Acrylonitrile [C]	0	--	--	5.1E-01	2.5E+00	--	--	5.1E-01	2.5E+00	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E-01**	**2.5E+00**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	3.0E+00	--	4.9E-04	5.0E-04	--	--	--	--	--	--	--	--	**3.0E+00**	**--**	**4.9E-04**	**5.0E-04**
Ammonia-N (mg/l) (Yearly)	0	2.30E+01	2.54E+00	--	--	2.3E+01	2.5E+00	--	--	--	--	--	--	--	--	--	--	**2.3E+01**	**2.5E+00**	**--**	**--**
Ammonia-N (mg/l) (High Flow) Jan-May	0	2.30E+01	4.73E+00	--	--	2.3E+01	4.7E+00	--	--	--	--	--	--	--	--	--	--	**2.3E+01**	**4.7E+00**	**--**	**--**
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	8.3E+03	4.0E+04	--	--	--	--	--	--	--	--	**--**	**--**	**8.3E+03**	**4.0E+04**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	5.6E+00	6.4E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.6E+00**	**6.4E+02**
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	3.4E+02	1.5E+02	1.0E+01	--	--	--	--	--	--	--	--	--	**3.4E+02**	**1.5E+02**	**1.0E+01**	**--**
Barium	0	--	--	2.0E+03	--	--	--	2.0E+03	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.0E+03**	**--**
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	2.2E+01	5.1E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.2E+01**	**5.1E+02**
Benzidine [C]	0	--	--	8.6E-04	2.0E-03	--	--	8.6E-04	2.0E-03	--	--	--	--	--	--	--	--	**--**	**--**	**8.6E-04**	**2.0E-03**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	**--**	**--**	**3.8E-02**	**1.8E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	3.0E-01	5.3E+00	--	--	--	--	--	--	--	--	**--**	**--**	**3.0E-01**	**5.3E+00**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.4E+03	6.5E+04	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+03**	**6.5E+04**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	1.2E+01	2.2E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.2E+01**	**2.2E+01**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	4.3E+01	1.4E+03	--	--	--	--	--	--	--	--	**--**	**--**	**4.3E+01**	**1.4E+03**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.5E+03	1.9E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.5E+03**	**1.9E+03**
Cadmium	0	5.1E+00	1.4E+00	5.0E+00	--	5.1E+00	1.4E+00	5.0E+00	--	--	--	--	--	--	--	--	--	**5.1E+00**	**1.4E+00**	**5.0E+00**	**--**
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	2.3E+00	1.6E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.3E+00**	**1.6E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	2.4E+00	4.3E-03	8.0E-03	8.1E-03	--	--	--	--	--	--	--	--	**2.4E+00**	**4.3E-03**	**8.0E-03**	**8.1E-03**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	8.6E+05	2.3E+05	2.5E+05	--	--	--	--	--	--	--	--	--	**8.6E+05**	**2.3E+05**	**2.5E+05**	**--**
TRC	0	1.9E+01	1.1E+01	--	--	1.9E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	**1.9E+01**	**1.1E+01**	**--**	**--**
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.3E+02	1.6E+03	--	--	--	--	--	--	--	--	**--**	**--**	**1.3E+02**	**1.6E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	4.0E+00	1.3E+02	--	--	--	--	--	--	--	--	--	--	**4.0E+00**	**1.3E+02**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.4E+02	1.1E+04	--	--	--	--	--	--	--	--	--	--	**3.4E+02**	**1.1E+04**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.0E+03	1.6E+03	--	--	--	--	--	--	--	--	--	--	**1.0E+03**	**1.6E+03**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.1E+01	1.5E+02	--	--	--	--	--	--	--	--	--	--	**8.1E+01**	**1.5E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	8.3E-02	4.1E-02	--	--	--	--	--	--	--	--	--	--	**8.3E-02**	**4.1E-02**	--	--
Chromium III	0	6.9E+02	9.0E+01	--	--	6.9E+02	9.0E+01	--	--	--	--	--	--	--	--	--	--	**6.9E+02**	**9.0E+01**	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.6E+01	1.1E+01	--	--	--	--	--	--	--	--	--	--	**1.6E+01**	**1.1E+01**	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	--	--	**1.0E+02**	--
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	3.8E-03	1.8E-02	--	--	--	--	--	--	--	--	--	--	**3.8E-03**	**1.8E-02**
Copper	0	1.7E+01	1.1E+01	1.3E+03	--	1.7E+01	1.1E+01	1.3E+03	--	--	--	--	--	--	--	--	--	**1.7E+01**	**1.1E+01**	**1.3E+03**	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	2.2E+01	5.2E+00	1.4E+02	1.6E+04	--	--	--	--	--	--	--	--	**2.2E+01**	**5.2E+00**	**1.4E+02**	**1.6E+04**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	3.1E-03	3.1E-03	--	--	--	--	--	--	--	--	--	--	**3.1E-03**	**3.1E-03**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	--	--	**2.2E-03**	**2.2E-03**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	1.1E+00	1.0E-03	2.2E-03	2.2E-03	--	--	--	--	--	--	--	--	**1.1E+00**	**1.0E-03**	**2.2E-03**	**2.2E-03**
Demeton	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	**1.0E-01**	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.7E-01	1.7E-01	--	--	--	--	--	--	--	--	--	--	**1.7E-01**	**1.7E-01**	--	--
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	**3.8E-02**	**1.8E-01**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.2E+02	1.3E+03	--	--	--	--	--	--	--	--	--	--	**4.2E+02**	**1.3E+03**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.2E+02	9.6E+02	--	--	--	--	--	--	--	--	--	--	**3.2E+02**	**9.6E+02**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.3E+01	1.9E+02	--	--	--	--	--	--	--	--	--	--	**6.3E+01**	**1.9E+02**
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	2.1E-01	2.8E-01	--	--	--	--	--	--	--	--	--	--	**2.1E-01**	**2.8E-01**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	5.5E+00	1.7E+02	--	--	--	--	--	--	--	--	--	--	**5.5E+00**	**1.7E+02**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	3.8E+00	3.7E+02	--	--	--	--	--	--	--	--	--	--	**3.8E+00**	**3.7E+02**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.3E+02	7.1E+03	--	--	--	--	--	--	--	--	--	--	**3.3E+02**	**7.1E+03**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.4E+02	1.0E+04	--	--	--	--	--	--	--	--	--	--	**1.4E+02**	**1.0E+04**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	7.7E+01	2.9E+02	--	--	--	--	--	--	--	--	--	--	**7.7E+01**	**2.9E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.0E+02	--	--	--	--	--	--	--	--	--	--	--	**1.0E+02**	--
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	5.0E+00	1.5E+02	--	--	--	--	--	--	--	--	--	--	**5.0E+00**	**1.5E+02**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	3.4E+00	2.1E+02	--	--	--	--	--	--	--	--	--	--	**3.4E+00**	**2.1E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	2.4E-01	5.6E-02	5.2E-04	5.4E-04	--	--	--	--	--	--	--	--	**2.4E-01**	**5.6E-02**	**5.2E-04**	**5.4E-04**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.7E+04	4.4E+04	--	--	--	--	--	--	--	--	--	--	**1.7E+04**	**4.4E+04**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	3.8E+02	8.5E+02	--	--	--	--	--	--	--	--	--	--	**3.8E+02**	**8.5E+02**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	2.7E+05	1.1E+06	--	--	--	--	--	--	--	--	--	--	**2.7E+05**	**1.1E+06**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.0E+03	4.5E+03	--	--	--	--	--	--	--	--	--	--	**2.0E+03**	**4.5E+03**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	6.9E+01	5.3E+03	--	--	--	--	--	--	--	--	--	--	**6.9E+01**	**5.3E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.3E+01	2.8E+02	--	--	--	--	--	--	--	--	--	--	**1.3E+01**	**2.8E+02**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	1.1E+00	3.4E+01	--	--	--	--	--	--	--	--	--	--	**1.1E+00**	**3.4E+01**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.0E-08	5.1E-08	--	--	--	--	--	--	--	--	--	--	**5.0E-08**	**5.1E-08**
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	3.6E-01	2.0E+00	--	--	--	--	--	--	--	--	--	--	**3.6E-01**	**2.0E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.6E-02	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**6.2E+01**	**8.9E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	2.2E-01	5.6E-02	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	**6.2E+01**	**8.9E+01**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	**2.2E-01**	**5.6E-02**	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.2E+01	8.9E+01	--	--	--	--	--	--	--	--	--	--	**6.2E+01**	**8.9E+01**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	8.6E-02	3.6E-02	5.9E-02	6.0E-02	--	--	--	--	--	--	--	--	**8.6E-02**	**3.6E-02**	**5.9E-02**	**6.0E-02**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	2.9E-01	3.0E-01	--	--	--	--	--	--	--	--	--	--	**2.9E-01**	**3.0E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	5.3E+02	2.1E+03	--	--	--	--	--	--	--	--	--	--	**5.3E+02**	**2.1E+03**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.3E+02	1.4E+02	--	--	--	--	--	--	--	--	--	--	**1.3E+02**	**1.4E+02**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.1E+03	5.3E+03	--	--	--	--	--	--	--	--	--	--	**1.1E+03**	**5.3E+03**
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.0E+02	--	--	--	--	--	--	--	--	--	--	--	**5.0E+02**	**--**
Guthion	0	--	1.0E-02	--	--	--	1.0E-02	--	--	--	--	--	--	--	--	--	--	--	**1.0E-02**	**--**	**--**
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	5.2E-01	3.8E-03	7.9E-04	7.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**7.9E-04**	**7.9E-04**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	5.2E-01	3.8E-03	3.9E-04	3.9E-04	--	--	--	--	--	--	--	--	**5.2E-01**	**3.8E-03**	**3.9E-04**	**3.9E-04**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	2.8E-03	2.9E-03	--	--	--	--	--	--	--	--	--	--	**2.8E-03**	**2.9E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	4.4E+00	1.8E+02	--	--	--	--	--	--	--	--	--	--	**4.4E+00**	**1.8E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	2.6E-02	4.9E-02	--	--	--	--	--	--	--	--	--	--	**2.6E-02**	**4.9E-02**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	9.1E-02	1.7E-01	--	--	--	--	--	--	--	--	--	--	**9.1E-02**	**1.7E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	9.5E-01	--	9.8E-01	1.8E+00	--	--	--	--	--	--	--	--	**9.5E-01**	**--**	**9.8E-01**	**1.8E+00**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.0E+01	1.1E+03	--	--	--	--	--	--	--	--	--	--	**4.0E+01**	**1.1E+03**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	1.4E+01	3.3E+01	--	--	--	--	--	--	--	--	--	--	**1.4E+01**	**3.3E+01**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	2.0E+00	--	--	--	--	--	--	--	--	--	--	--	**2.0E+00**	**--**	**--**
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	3.8E-02	1.8E-01	--	--	--	--	--	--	--	--	--	--	**3.8E-02**	**1.8E-01**
Iron	0	--	--	3.0E+02	--	--	--	3.0E+02	--	--	--	--	--	--	--	--	--	--	--	**3.0E+02**	**--**
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	3.5E+02	9.6E+03	--	--	--	--	--	--	--	--	--	--	**3.5E+02**	**9.6E+03**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	**--**	**--**
Lead	0	1.6E+02	1.8E+01	1.5E+01	--	1.6E+02	1.8E+01	1.5E+01	--	--	--	--	--	--	--	--	--	**1.6E+02**	**1.8E+01**	**1.5E+01**	**--**
Malathion	0	--	1.0E-01	--	--	--	1.0E-01	--	--	--	--	--	--	--	--	--	--	--	**1.0E-01**	**--**	**--**
Manganese	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	--	**--**	**5.0E+01**	**--**
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.4E+00	7.7E-01	- -	- -	--	--	--	--	--	--	--	--	**1.4E+00**	**7.7E-01**	**- -**	**- -**
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	4.7E+01	1.5E+03	--	--	--	--	--	--	--	--	--	--	**4.7E+01**	**1.5E+03**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	4.6E+01	5.9E+03	--	--	--	--	--	--	--	--	--	--	**4.6E+01**	**5.9E+03**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	3.0E-02	1.0E+02	--	--	--	--	--	--	--	--	--	--	**3.0E-02**	**1.0E+02**	**--**
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	--	--	--	--	--	--	--	--	**0.0E+00**	**--**	**--**
Nickel	0	2.2E+02	2.5E+01	6.1E+02	4.6E+03	2.2E+02	2.5E+01	6.1E+02	4.6E+03	--	--	--	--	--	--	--	--	**2.2E+02**	**2.5E+01**	**6.1E+02**	**4.6E+03**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.0E+04	--	--	--	--	--	--	--	--	--	--	--	**1.0E+04**	**--**
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.7E+01	6.9E+02	--	--	--	--	--	--	--	--	--	--	**1.7E+01**	**6.9E+02**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	6.9E-03	3.0E+01	--	--	--	--	--	--	--	--	--	--	**6.9E-03**	**3.0E+01**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	3.3E+01	6.0E+01	--	--	--	--	--	--	--	--	--	--	**3.3E+01**	**6.0E+01**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	5.0E-02	5.1E+00	--	--	--	--	--	--	--	--	--	--	**5.0E-02**	**5.1E+00**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	--	--	--	--	--	--	--	--	--	--	**2.8E+01**	**6.6E+00**	**--**	**--**
Parathion	0	6.5E-02	1.3E-02	--	--	6.5E-02	1.3E-02	--	--	--	--	--	--	--	--	--	--	**6.5E-02**	**1.3E-02**	**--**	**--**
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.4E-02	6.4E-04	6.4E-04	--	--	--	--	--	--	--	--	--	**1.4E-02**	**6.4E-04**	**6.4E-04**
Pentachlorophenol [C]	0	3.5E+00	2.7E+00	2.7E+00	3.0E+01	3.5E+00	2.7E+00	2.7E+00	3.0E+01	--	--	--	--	--	--	--	--	**3.5E+00**	**2.7E+00**	**2.7E+00**	**3.0E+01**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.0E+04	8.6E+05	--	--	--	--	--	--	--	--	--	--	**1.0E+04**	**8.6E+05**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	8.3E+02	4.0E+03	--	--	--	--	--	--	--	--	--	--	**8.3E+02**	**4.0E+03**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.5E+01	--	--	--	--	--	--	--	--	--	--	--	**1.5E+01**	**--**
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	4.0E+00	4.0E+00	--	--	--	--	--	--	--	--	--	--	**4.0E+00**	**4.0E+00**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.0E+00	--	--	--	--	--	--	--	--	--	--	--	**5.0E+00**	**--**
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.0E+01	--	--	--	--	--	--	--	--	--	--	--	**3.0E+01**	**--**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	2.0E+01	5.0E+00	1.7E+02	4.2E+03	--	--	--	--	--	--	--	--	**2.0E+01**	**5.0E+00**	**1.7E+02**	**4.2E+03**
Silver	0	5.1E+00	--	--	--	5.1E+00	--	--	--	--	--	--	--	--	--	--	--	**5.1E+00**	**--**	**--**	**--**
Sulfate	0	--	--	2.5E+05	--	--	--	2.5E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+05**	**--**
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	1.7E+00	4.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.7E+00**	**4.0E+01**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	6.9E+00	3.3E+01	--	--	--	--	--	--	--	--	**--**	**--**	**6.9E+00**	**3.3E+01**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.4E-01	4.7E-01	--	--	--	--	--	--	--	--	**--**	**--**	**2.4E-01**	**4.7E-01**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.1E+02	6.0E+03	--	--	--	--	--	--	--	--	**--**	**--**	**5.1E+02**	**6.0E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.0E+05	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+05**	**--**
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	7.3E-01	2.0E-04	2.8E-03	2.8E-03	--	--	--	--	--	--	--	--	**7.3E-01**	**2.0E-04**	**2.8E-03**	**2.8E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	4.6E-01	7.2E-02	--	--	--	--	--	--	--	--	--	--	**4.6E-01**	**7.2E-02**	**--**	**--**
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.5E+01	7.0E+01	--	--	--	--	--	--	--	--	**--**	**--**	**3.5E+01**	**7.0E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	5.9E+00	1.6E+02	--	--	--	--	--	--	--	--	**--**	**--**	**5.9E+00**	**1.6E+02**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	2.5E+01	3.0E+02	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E+01**	**3.0E+02**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	1.4E+01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**1.4E+01**	**2.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.0E+01	--	--	--	--	--	--	--	--	--	**--**	**--**	**5.0E+01**	**--**
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	2.5E-01	2.4E+01	--	--	--	--	--	--	--	--	**--**	**--**	**2.5E-01**	**2.4E+01**
Zinc	0	1.4E+02	1.4E+02	7.4E+03	2.6E+04	1.4E+02	1.4E+02	7.4E+03	2.6E+04	--	--	--	--	--	--	--	--	**1.4E+02**	**1.4E+02**	**7.4E+03**	**2.6E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	5.6E+00
Arsenic	1.0E+01
Barium	2.0E+03
Cadmium	8.2E-01
Chromium III	5.4E+01
Chromium VI	6.4E+00
Copper	6.5E+00
Iron	3.0E+02
Lead	1.1E+01
Manganese	5.0E+01
Mercury	4.6E-01
Nickel	1.5E+01
Selenium	3.0E+00
Silver	2.1E+00
Zinc	5.7E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.015 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD 0.015

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.015	0.015
7Q10	0.000	N/A	0.015	N/A
30Q10	0.000	0.000	0.015	0.015
30Q5	0.000	N/A	0.015	N/A
Harm. Mean	0.000	N/A	0.015	N/A
Annual Avg.	0.000	N/A	0.015	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	24.200	12.600
30Q10 90th% Temp. Mix (deg C)	24.200	12.600
1Q10 90th% pH Mix (SU)	7.400	7.400
30Q10 90th% pH Mix (SU)	7.400	7.400
1Q10 10th% pH Mix (SU)	6.100	N/A
7Q10 10th% pH Mix (SU)	6.100	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	126.0	126.0
7Q10 Hardness (mg/L as CaCO3)	126.0	126.0

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.400
(7.204 - pH)	-0.196
(pH - 7.204)	0.196
Trout Present Criterion (mg N/l	15.341
Trout Absent Criterion (mg N/L	22.972
Trout Present?	n
Effective Criterion (mg N/L)	22.972

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	24.200
90th Percentile pH (SU)	7.400
MIN	1.527
MAX	24.200
(7.688 - pH)	0.288
(pH - 7.688)	-0.288
Early LS Present Criterion (mg N	2.536
Early LS Absent Criterion (mg N/	2.536
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.536

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.400
(7.204 - pH)	-0.196
(pH - 7.204)	0.196
Trout Present Criterion (mg N/l	15.341
Trout Absent Criterion (mg N/L	22.972
Trout Present?	n
Effective Criterion (mg N/L)	22.972

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	12.600
90th Percentile pH (SU)	7.400
MIN	2.850
MAX	12.600
(7.688 - pH)	0.288
(pH - 7.688)	-0.288
Early LS Present Criterion (mg N	4.734
Early LS Absent Criterion (mg N/	5.357
Early Life Stages Present?	y
Effective Criterion (mg N/L)	4.734

0.015 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD 0.015

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.000	0.000	0.015	0.015
7Q10	0.000	N/A	0.015	N/A
30Q10	0.000	0.000	0.015	0.015
30Q5	0.000	N/A	0.015	N/A
Harm. Mean	0.000	N/A	0.015	N/A
Annual Avg.	0.000	N/A	0.015	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	24.200	12.600
30Q10 90th% Temp. Mix (deg C)	24.200	12.600
1Q10 90th% pH Mix (SU)	7.400	7.400
30Q10 90th% pH Mix (SU)	7.400	7.400
1Q10 10th% pH Mix (SU)	6.100	N/A
7Q10 10th% pH Mix (SU)	6.100	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	126.000	126.000
7Q10 Hardness (mg/L as CaCO3) =	126.000	126.000

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.400
(7.204 - pH)	-0.196
(pH - 7.204)	0.196
Trout Present Criterion (mg N/l	15.341
Trout Absent Criterion (mg N/L	22.972
Trout Present?	n
Effective Criterion (mg N/L)	22.972

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	24.200
90th Percentile pH (SU)	7.400
MIN	1.527
MAX	24.200
(7.688 - pH)	0.288
(pH - 7.688)	-0.288
Early LS Present Criterion (mg N	2.536
Early LS Absent Criterion (mg N/	2.536
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.536

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	7.400
(7.204 - pH)	-0.196
(pH - 7.204)	0.196
Trout Present Criterion (mg N/l	15.341
Trout Absent Criterion (mg N/L	22.972
Trout Present?	n
Effective Criterion (mg N/L)	22.972

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	12.600
90th Percentile pH (SU)	7.400
MIN	2.850
MAX	12.600
(7.688 - pH)	0.288
(pH - 7.688)	-0.288
Early LS Present Criterion (mg N	4.734
Early LS Absent Criterion (mg N/	5.357
Early Life Stages Present?	y
Effective Criterion (mg N/L)	4.734

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Tanglewood Home for Adults WWTP Permit No.: VA0090646

Receiving Stream: Thorny Branch - perennial Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		
Mean Hardness (as CaCO3) =	126	mg/L
90% Temperature (Annual) =	24.2	deg C
90% Temperature (Wet season) =	12.6	deg C
90% Maximum pH =	8.1	SU
10% Maximum pH =	7.5	SU
Tier Designation (1 or 2) =	2	
Public Water Supply (PWS) Y/N? =	y	
Trout Present Y/N? =	n	
Early Life Stages Present Y/N? =	y	

Stream Flows		
1Q10 (Annual) =	0.1	MGD
7Q10 (Annual) =	0.11	MGD
30Q10 (Annual) =	0.13	MGD
1Q10 (Wet season) =	0.23	MGD
30Q10 (Wet season)	0.39	MGD
30Q5 =	0.15	MGD
Harmonic Mean =	0.45	MGD

Mixing Information		
Annual - 1Q10 Mix =	100	%
- 7Q10 Mix =	100	%
- 30Q10 Mix =	100	%
Wet Season - 1Q10 Mix =	100	%
- 30Q10 Mix =	100	%

Effluent Information		
Mean Hardness (as CaCO3) =	126	mg/L
90% Temp (Annual) =	24.2	deg C
90% Temp (Wet season) =	12.6	deg C
90% Maximum pH =	7.4	SU
10% Maximum pH =	6.1	SU
Discharge Flow =	0.015	MGD

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				**Most Limiting Allocations**			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	**Acute**	**Chronic**	**HH (PWS)**	**HH**
Acenapthene	0	--	--	6.7E+02	9.9E+02	--	--	7.4E+03	1.1E+04	--	--	6.7E+01	9.9E+01	--	--	7.4E+02	1.1E+03	--	--	**7.4E+02**	**1.1E+03**
Acrolein	0	--	--	6.1E+00	9.3E+00	--	--	6.7E+01	1.0E+02	--	--	6.1E-01	9.3E-01	--	--	6.7E+00	1.0E+01	--	--	**6.7E+00**	**1.0E+01**
Acrylonitrile[C]	0	--	--	5.1E-01	2.5E+00	--	--	1.6E+01	7.8E+01	--	--	5.1E-02	2.5E-01	--	--	1.6E+00	7.8E+00	--	--	**1.6E+00**	**7.8E+00**
Aldrin [C]	0	3.0E+00	--	4.9E-04	5.0E-04	2.3E+01	--	1.5E-02	1.6E-02	7.5E-01	--	4.9E-05	5.0E-05	5.8E+00	--	1.5E-03	1.6E-03	**5.8E+00**	--	**1.5E-03**	**1.6E-03**
Ammonia-N (mg/l) (Yearly)	0	9.81E+00	1.40E+00	--	--	7.5E+01	1.4E+01	--	--	2.45E+00	3.50E-01	--	--	1.9E+01	3.4E+00	--	--	**1.9E+01**	**3.4E+00**	--	--
Ammonia-N (mg/l) (High Flow Jan - May	0	8.33E+00	2.30E+00	--	--	1.4E+02	6.2E+01	--	--	2.08E+00	5.74E-01	--	--	3.4E+01	1.5E+01	--	--	**3.4E+01**	**1.5E+01**	--	--
Anthracene	0	--	--	8.3E+03	4.0E+04	--	--	9.1E+04	4.4E+05	--	--	8.3E+02	4.0E+03	--	--	9.1E+03	4.4E+04	--	--	**9.1E+03**	**4.4E+04**
Antimony	0	--	--	5.6E+00	6.4E+02	--	--	6.2E+01	7.0E+03	--	--	5.6E-01	6.4E+01	--	--	6.2E+00	7.0E+02	--	--	**6.2E+00**	**7.0E+02**
Arsenic	0	3.4E+02	1.5E+02	1.0E+01	--	2.6E+03	1.3E+03	1.1E+02	--	8.5E+01	3.8E+01	1.0E+00	--	6.5E+02	3.1E+02	1.1E+01	--	**6.5E+02**	**3.1E+02**	**1.1E+01**	--
Barium	0	--	--	2.0E+03	--	--	--	2.2E+04	--	--	--	2.0E+02	--	--	--	2.2E+03	--	--	--	**2.2E+03**	--
Benzene [C]	0	--	--	2.2E+01	5.1E+02	--	--	6.8E+02	1.6E+04	--	--	2.2E+00	5.1E+01	--	--	6.8E+01	1.6E+03	--	--	**6.8E+01**	**1.6E+03**
Benzidine[C]	0	--	--	8.6E-04	2.0E-03	--	--	2.7E-02	6.2E-02	--	--	8.6E-05	2.0E-04	--	--	2.7E-03	6.2E-03	--	--	**2.7E-03**	**6.2E-03**
Benzo (a) anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
Benzo (b) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
Benzo (k) fluoranthene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
Benzo (a) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
Bis2-Chloroethyl Ether [C]	0	--	--	3.0E-01	5.3E+00	--	--	9.3E+00	1.6E+02	--	--	3.0E-02	5.3E-01	--	--	9.3E-01	1.6E+01	--	--	**9.3E-01**	**1.6E+01**
Bis2-Chloroisopropyl Ether	0	--	--	1.4E+03	6.5E+04	--	--	1.5E+04	7.2E+05	--	--	1.4E+02	6.5E+03	--	--	1.5E+03	7.2E+04	--	--	**1.5E+03**	**7.2E+04**
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	1.2E+01	2.2E+01	--	--	3.7E+02	6.8E+02	--	--	1.2E+00	2.2E+00	--	--	3.7E+01	6.8E+01	--	--	**3.7E+01**	**6.8E+01**
Bromoform [C]	0	--	--	4.3E+01	1.4E+03	--	--	1.3E+03	4.3E+04	--	--	4.3E+00	1.4E+02	--	--	1.3E+02	4.3E+03	--	--	**1.3E+02**	**4.3E+03**
Butylbenzylphthalate	0	--	--	1.5E+03	1.9E+03	--	--	1.7E+04	2.1E+04	--	--	1.5E+02	1.9E+02	--	--	1.7E+03	2.1E+03	--	--	**1.7E+03**	**2.1E+03**
Cadmium	0	5.1E+00	1.4E+00	5.0E+00	--	3.9E+01	1.1E+01	5.5E+01	--	1.3E+00	3.4E-01	5.0E-01	--	9.8E+00	2.8E+00	5.5E+00	--	**9.8E+00**	**2.8E+00**	**5.5E+00**	--
Carbon Tetrachloride [C]	0	--	--	2.3E+00	1.6E+01	--	--	7.1E+01	5.0E+02	--	--	2.3E-01	1.6E+00	--	--	7.1E+00	5.0E+01	--	--	**7.1E+00**	**5.0E+01**
Chlordane [C]	0	2.4E+00	4.3E-03	8.0E-03	8.1E-03	1.8E+01	3.6E-02	2.5E-01	2.5E-01	6.0E-01	1.1E-03	8.0E-04	8.1E-04	4.6E+00	9.0E-03	2.5E-02	2.5E-02	**4.6E+00**	**9.0E-03**	**2.5E-02**	**2.5E-02**
Chloride	0	8.6E+05	2.3E+05	2.5E+05	--	6.6E+06	1.9E+06	2.8E+06	--	2.2E+05	5.8E+04	2.5E+04	--	1.6E+06	4.8E+05	2.8E+05	--	**1.6E+06**	**4.8E+05**	**2.8E+05**	--
TRC	0	1.9E+01	1.1E+01	--	--	1.5E+02	9.2E+01	--	--	4.8E+00	2.8E+00	--	--	3.6E+01	2.3E+01	--	--	**3.6E+01**	**2.3E+01**	--	--
Chlorobenzene	0	--	--	1.3E+02	1.6E+03	--	--	1.4E+03	1.8E+04	--	--	1.3E+01	1.6E+02	--	--	1.4E+02	1.8E+03	--	--	**1.4E+02**	**1.8E+03**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	4.0E+00	1.3E+02	--	--	1.2E+02	4.0E+03	--	--	4.0E-01	1.3E+01	--	--	1.2E+01	4.0E+02	--	--	**1.2E+01**	**4.0E+02**
Chloroform	0	--	--	3.4E+02	1.1E+04	--	--	3.7E+03	1.2E+05	--	--	3.4E+01	1.1E+03	--	--	3.7E+02	1.2E+04	--	--	**3.7E+02**	**1.2E+04**
2-Chloronaphthalene	0	--	--	1.0E+03	1.6E+03	--	--	1.1E+04	1.8E+04	--	--	1.0E+02	1.6E+02	--	--	1.1E+03	1.8E+03	--	--	**1.1E+03**	**1.8E+03**
2-Chlorophenol	0	--	--	8.1E+01	1.5E+02	--	--	8.9E+02	1.7E+03	--	--	8.1E+00	1.5E+01	--	--	8.9E+01	1.7E+02	--	--	**8.9E+01**	**1.7E+02**
Chlorpyrifos	0	8.3E-02	4.1E-02	--	--	6.4E-01	3.4E-01	--	--	2.1E-02	1.0E-02	--	--	1.6E-01	8.5E-02	--	--	**1.6E-01**	**8.5E-02**	--	--
Chromium III	0	6.9E+02	9.0E+01	--	--	5.3E+03	7.5E+02	--	--	1.7E+02	2.2E+01	--	--	1.3E+03	1.9E+02	--	--	**1.3E+03**	**1.9E+02**	--	--
Chromium VI	0	1.6E+01	1.1E+01	--	--	1.2E+02	9.2E+01	--	--	4.0E+00	2.8E+00	--	--	3.1E+01	2.3E+01	--	--	**3.1E+01**	**2.3E+01**	--	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	1.1E+03	--	--	--	1.0E+01	--	--	--	1.1E+02	--	--	--	**1.1E+02**	--
Chrysene [C]	0	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	3.8E-04	1.8E-03	--	--	1.2E-02	5.6E-02	--	--	**1.2E-02**	**5.6E-02**
Copper	0	1.7E+01	1.1E+01	1.3E+03	--	1.3E+02	9.1E+01	1.4E+04	--	4.2E+00	2.7E+00	1.3E+02	--	3.2E+01	2.3E+01	1.4E+03	--	**3.2E+01**	**2.3E+01**	**1.4E+03**	--
Cyanide, Free	0	2.2E+01	5.2E+00	1.4E+02	1.6E+04	1.7E+02	4.3E+01	1.5E+03	1.8E+05	5.5E+00	1.3E+00	1.4E+01	1.6E+03	4.2E+01	1.1E+01	1.5E+02	1.8E+04	**4.2E+01**	**1.1E+01**	**1.5E+02**	**1.8E+04**
DDD [C]	0	--	--	3.1E-03	3.1E-03	--	--	9.6E-02	9.6E-02	--	--	3.1E-04	3.1E-04	--	--	9.6E-03	9.6E-03	--	--	**9.6E-03**	**9.6E-03**
DDE [C]	0	--	--	2.2E-03	2.2E-03	--	--	6.8E-02	6.8E-02	--	--	2.2E-04	2.2E-04	--	--	6.8E-03	6.8E-03	--	--	**6.8E-03**	**6.8E-03**
DDT [C]	0	1.1E+00	1.0E-03	2.2E-03	2.2E-03	8.4E+00	8.3E-03	6.8E-02	6.8E-02	2.8E-01	2.5E-04	2.2E-04	2.2E-04	2.1E+00	2.1E-03	6.8E-03	6.8E-03	**2.1E+00**	**2.1E-03**	**6.8E-03**	**6.8E-03**
Demeton	0	--	1.0E-01	--	--	--	8.3E-01	--	--	--	2.5E-02	--	--	--	2.1E-01	--	--	--	**2.1E-01**	--	--
Diazinon	0	1.7E-01	1.7E-01	--	--	1.3E+00	1.4E+00	--	--	4.3E-02	4.3E-02	--	--	3.3E-01	3.5E-01	--	--	**3.3E-01**	**3.5E-01**	--	--
Dibenz(a,h)anthracene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
1,2-Dichlorobenzene	0	--	--	4.2E+02	1.3E+03	--	--	4.6E+03	1.4E+04	--	--	4.2E+01	1.3E+02	--	--	4.6E+02	1.4E+03	--	--	**4.6E+02**	**1.4E+03**
1,3-Dichlorobenzene	0	--	--	3.2E+02	9.6E+02	--	--	3.5E+03	1.1E+04	--	--	3.2E+01	9.6E+01	--	--	3.5E+02	1.1E+03	--	--	**3.5E+02**	**1.1E+03**
1,4-Dichlorobenzene	0	--	--	6.3E+01	1.9E+02	--	--	6.9E+02	2.1E+03	--	--	6.3E+00	1.9E+01	--	--	6.9E+01	2.1E+02	--	--	**6.9E+01**	**2.1E+02**
3,3-Dichlorobenzidine[C]	0	--	--	2.1E-01	2.8E-01	--	--	6.5E+00	8.7E+00	--	--	2.1E-02	2.8E-02	--	--	6.5E-01	8.7E-01	--	--	**6.5E-01**	**8.7E-01**
Dichlorobromomethane [C]	0	--	--	5.5E+00	1.7E+02	--	--	1.7E+02	5.3E+03	--	--	5.5E-01	1.7E+01	--	--	1.7E+01	5.3E+02	--	--	**1.7E+01**	**5.3E+02**
1,2-Dichloroethane [C]	0	--	--	3.8E+00	3.7E+02	--	--	1.2E+02	1.1E+04	--	--	3.8E-01	3.7E+01	--	--	1.2E+01	1.1E+03	--	--	**1.2E+01**	**1.1E+03**
1,1-Dichloroethylene	0	--	--	3.3E+02	7.1E+03	--	--	3.6E+03	7.8E+04	--	--	3.3E+01	7.1E+02	--	--	3.6E+02	7.8E+03	--	--	**3.6E+02**	**7.8E+03**
1,2-trans-dichloroethylene	0	--	--	1.4E+02	1.0E+04	--	--	1.5E+03	1.1E+05	--	--	1.4E+01	1.0E+03	--	--	1.5E+02	1.1E+04	--	--	**1.5E+02**	**1.1E+04**
2,4-Dichlorophenol	0	--	--	7.7E+01	2.9E+02	--	--	8.5E+02	3.2E+03	--	--	7.7E+00	2.9E+01	--	--	8.5E+01	3.2E+02	--	--	**8.5E+01**	**3.2E+02**
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	1.0E+02	--	--	--	1.1E+03	--	--	--	1.0E+01	--	--	--	1.1E+02	--	--	--	**1.1E+02**	--
1,2-Dichloropropane[C]	0	--	--	5.0E+00	1.5E+02	--	--	1.6E+02	4.7E+03	--	--	5.0E-01	1.5E+01	--	--	1.6E+01	4.7E+02	--	--	**1.6E+01**	**4.7E+02**
1,3-Dichloropropene [C]	0	--	--	3.4E+00	2.1E+02	--	--	1.1E+02	6.5E+03	--	--	3.4E-01	2.1E+01	--	--	1.1E+01	6.5E+02	--	--	**1.1E+01**	**6.5E+02**
Dieldrin [C]	0	2.4E-01	5.6E-02	5.2E-04	5.4E-04	1.8E+00	4.7E-01	1.6E-02	1.7E-02	6.0E-02	1.4E-02	5.2E-05	5.4E-05	4.6E-01	1.2E-01	1.6E-03	1.7E-03	**4.6E-01**	**1.2E-01**	**1.6E-03**	**1.7E-03**
Diethyl Phthalate	0	--	--	1.7E+04	4.4E+04	--	--	1.9E+05	4.8E+05	--	--	1.7E+03	4.4E+03	--	--	1.9E+04	4.8E+04	--	--	**1.9E+04**	**4.8E+04**
2,4-Dimethylphenol	0	--	--	3.8E+02	8.5E+02	--	--	4.2E+03	9.4E+03	--	--	3.8E+01	8.5E+01	--	--	4.2E+02	9.4E+02	--	--	**4.2E+02**	**9.4E+02**
Dimethyl Phthalate	0	--	--	2.7E+05	1.1E+06	--	--	3.0E+06	1.2E+07	--	--	2.7E+04	1.1E+05	--	--	3.0E+05	1.2E+06	--	--	**3.0E+05**	**1.2E+06**
Di-n-Butyl Phthalate	0	--	--	2.0E+03	4.5E+03	--	--	2.2E+04	5.0E+04	--	--	2.0E+02	4.5E+02	--	--	2.2E+03	5.0E+03	--	--	**2.2E+03**	**5.0E+03**
2,4 Dinitrophenol	0	--	--	6.9E+01	5.3E+03	--	--	7.6E+02	5.8E+04	--	--	6.9E+00	5.3E+02	--	--	7.6E+01	5.8E+03	--	--	**7.6E+01**	**5.8E+03**
2-Methyl-4,6-Dinitrophenol	0	--	--	1.3E+01	2.8E+02	--	--	1.4E+02	3.1E+03	--	--	1.3E+00	2.8E+01	--	--	1.4E+01	3.1E+02	--	--	**1.4E+01**	**3.1E+02**
2,4-Dinitrotoluene [C]	0	--	--	1.1E+00	3.4E+01	--	--	3.4E+01	1.1E+03	--	--	1.1E-01	3.4E+00	--	--	3.4E+00	1.1E+02	--	--	**3.4E+00**	**1.1E+02**
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	5.0E-08	5.1E-08	--	--	5.5E-07	5.6E-07	--	--	5.0E-09	5.1E-09	--	--	5.5E-08	5.6E-08	--	--	**5.5E-08**	**5.6E-08**
1,2-Diphenylhydrazine[C]	0	--	--	3.6E-01	2.0E+00	--	--	1.1E+01	6.2E+01	--	--	3.6E-02	2.0E-01	--	--	1.1E+00	6.2E+00	--	--	**1.1E+00**	**6.2E+00**
Alpha-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.7E+00	4.7E-01	6.8E+02	9.8E+02	5.5E-02	1.4E-02	6.2E+00	8.9E+00	4.2E-01	1.2E-01	6.8E+01	9.8E+01	**4.2E-01**	**1.2E-01**	**6.8E+01**	**9.8E+01**
Beta-Endosulfan	0	2.2E-01	5.6E-02	6.2E+01	8.9E+01	1.7E+00	4.7E-01	6.8E+02	9.8E+02	5.5E-02	1.4E-02	6.2E+00	8.9E+00	4.2E-01	1.2E-01	6.8E+01	9.8E+01	**4.2E-01**	**1.2E-01**	**6.8E+01**	**9.8E+01**
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.7E+00	4.7E-01	--	--	5.5E-02	1.4E-02	--	--	4.2E-01	1.2E-01	--	--	**4.2E-01**	**1.2E-01**	--	--
Endosulfan Sulfate	0	--	--	6.2E+01	8.9E+01	--	--	6.8E+02	9.8E+02	--	--	6.2E+00	8.9E+00	--	--	6.8E+01	9.8E+01	--	--	**6.8E+01**	**9.8E+01**
Endrin	0	8.6E-02	3.6E-02	5.9E-02	6.0E-02	6.6E-01	3.0E-01	6.5E-01	6.6E-01	2.2E-02	9.0E-03	5.9E-03	6.0E-03	1.6E-01	7.5E-02	6.5E-02	6.6E-02	**1.6E-01**	**7.5E-02**	**6.5E-02**	**6.6E-02**
Endrin Aldehyde	0	--	--	2.9E-01	3.0E-01	--	--	3.2E+00	3.3E+00	--	--	2.9E-02	3.0E-02	--	--	3.2E-01	3.3E-01	--	--	**3.2E-01**	**3.3E-01**

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	5.3E+02	2.1E+03	--	--	5.8E+03	2.3E+04	--	--	5.3E+01	2.1E+02	--	--	5.8E+02	2.3E+03	--	--	**5.8E+02**	**2.3E+03**
Fluoranthene	0	--	--	1.3E+02	1.4E+02	--	--	1.4E+03	1.5E+03	--	--	1.3E+01	1.4E+01	--	--	1.4E+02	1.5E+02	--	--	**1.4E+02**	**1.5E+02**
Fluorene	0	--	--	1.1E+03	5.3E+03	--	--	1.2E+04	5.8E+04	--	--	1.1E+02	5.3E+02	--	--	1.2E+03	5.8E+03	--	--	**1.2E+03**	**5.8E+03**
Foaming Agents	0	--	--	5.0E+02	--	--	--	5.5E+03	--	--	--	5.0E+01	--	--	--	5.5E+02	--	--	--	**5.5E+02**	--
Guthion	0	--	1.0E-02	--	--	--	8.3E-02	--	--	--	2.5E-03	--	--	--	2.1E-02	--	--	--	**2.1E-02**	--	--
Heptachlor [C]	0	5.2E-01	3.8E-03	7.9E-04	7.9E-04	4.0E+00	3.2E-02	2.4E-02	2.4E-02	1.3E-01	9.5E-04	7.9E-05	7.9E-05	1.0E+00	7.9E-03	2.4E-03	2.4E-03	**1.0E+00**	**7.9E-03**	**2.4E-03**	**2.4E-03**
Heptachlor Epoxide[C]	0	5.2E-01	3.8E-03	3.9E-04	3.9E-04	4.0E+00	3.2E-02	1.2E-02	1.2E-02	1.3E-01	9.5E-04	3.9E-05	3.9E-05	1.0E+00	7.9E-03	1.2E-03	1.2E-03	**1.0E+00**	**7.9E-03**	**1.2E-03**	**1.2E-03**
Hexachlorobenzene[C]	0	--	--	2.8E-03	2.9E-03	--	--	8.7E-02	9.0E-02	--	--	2.8E-04	2.9E-04	--	--	8.7E-03	9.0E-03	--	--	**8.7E-03**	**9.0E-03**
Hexachlorobutadiene[C]	0	--	--	4.4E+00	1.8E+02	--	--	1.4E+02	5.6E+03	--	--	4.4E-01	1.8E+01	--	--	1.4E+01	5.6E+02	--	--	**1.4E+01**	**5.6E+02**
Hexachlorocyclohexane Alpha-BHC[C]	0	--	--	2.6E-02	4.9E-02	--	--	8.1E-01	1.5E+00	--	--	2.6E-03	4.9E-03	--	--	8.1E-02	1.5E-01	--	--	**8.1E-02**	**1.5E-01**
Hexachlorocyclohexane Beta-BHC[C]	0	--	--	9.1E-02	1.7E-01	--	--	2.8E+00	5.3E+00	--	--	9.1E-03	1.7E-02	--	--	2.8E-01	5.3E-01	--	--	**2.8E-01**	**5.3E-01**
Hexachlorocyclohexane Gamma-BHC[C] (Lindane)	0	9.5E-01	--	9.8E-01	1.8E+00	7.3E+00	--	3.0E+01	5.6E+01	2.4E-01	--	9.8E-02	1.8E-01	1.8E+00	--	3.0E+00	5.6E+00	**1.8E+00**	--	**3.0E+00**	**5.6E+00**
Hexachlorocyclopentadiene	0	--	--	4.0E+01	1.1E+03	--	--	4.4E+02	1.2E+04	--	--	4.0E+00	1.1E+02	--	--	4.4E+01	1.2E+03	--	--	**4.4E+01**	**1.2E+03**
Hexachloroethane[C]	0	--	--	1.4E+01	3.3E+01	--	--	4.3E+02	1.0E+03	--	--	1.4E+00	3.3E+00	--	--	4.3E+01	1.0E+02	--	--	**4.3E+01**	**1.0E+02**
Hydrogen Sulfide	0	--	2.0E+00	--	--	--	1.7E+01	--	--	--	5.0E-01	--	--	--	4.2E+00	--	--	--	**4.2E+00**	--	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	3.8E-02	1.8E-01	--	--	1.2E+00	5.6E+00	--	--	3.8E-03	1.8E-02	--	--	1.2E-01	5.6E-01	--	--	**1.2E-01**	**5.6E-01**
Iron	0	--	--	3.0E+02	--	--	--	3.3E+03	--	--	--	3.0E+01	--	--	--	3.3E+02	--	--	--	**3.3E+02**	--
Isophorone[C]	0	--	--	3.5E+02	9.6E+03	--	--	1.1E+04	3.0E+05	--	--	3.5E+01	9.6E+02	--	--	1.1E+03	3.0E+04	--	--	**1.1E+03**	**3.0E+04**
Kepone	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	**0.0E+00**	--	--
Lead	0	1.6E+02	1.8E+01	1.5E+01	--	1.2E+03	1.5E+02	1.7E+02	--	4.0E+01	4.5E+00	1.5E+00	--	3.1E+02	3.8E+01	1.7E+01	--	**3.1E+02**	**3.8E+01**	**1.7E+01**	--
Malathion	0	--	1.0E-01	--	--	--	8.3E-01	--	--	--	2.5E-02	--	--	--	2.1E-01	--	--	--	**2.1E-01**	--	--
Manganese	0	--	--	5.0E+01	--	--	--	5.5E+02	--	--	--	5.0E+00	--	--	--	5.5E+01	--	--	--	**5.5E+01**	--
Mercury	0	1.4E+00	7.7E-01	- -	- -	1.1E+01	6.4E+00	- -	- -	3.5E-01	1.9E-01	- -	--	2.7E+00	1.6E+00	- -	--	**2.7E+00**	**1.6E+00**	- -	- -
Methyl Bromide	0	--	--	4.7E+01	1.5E+03	--	--	5.2E+02	1.7E+04	--	--	4.7E+00	1.5E+02	--	--	5.2E+01	1.7E+03	--	--	**5.2E+01**	**1.7E+03**
Methylene Chloride [C]	0	--	--	4.6E+01	5.9E+03	--	--	1.4E+03	1.8E+05	--	--	4.6E+00	5.9E+02	--	--	1.4E+02	1.8E+04	--	--	**1.4E+02**	**1.8E+04**
Methoxychlor	0	--	3.0E-02	1.0E+02	--	--	2.5E-01	1.1E+03	--	--	7.5E-03	1.0E+01	--	--	6.3E-02	1.1E+02	--	--	**6.3E-02**	**1.1E+02**	--
Mirex	0	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	0.0E+00	--	--	--	**0.0E+00**	--	--
Nickel	0	2.2E+02	2.5E+01	6.1E+02	4.6E+03	1.7E+03	2.1E+02	6.7E+03	5.1E+04	5.5E+01	6.2E+00	6.1E+01	4.6E+02	4.2E+02	5.1E+01	6.7E+02	5.1E+03	**4.2E+02**	**5.1E+01**	**6.7E+02**	**5.1E+03**
Nitrate (as N)	0	--	--	1.0E+04	--	--	--	1.1E+05	--	--	--	1.0E+03	--	--	--	1.1E+04	--	--	--	**1.1E+04**	--
Nitrobenzene	0	--	--	1.7E+01	6.9E+02	--	--	1.9E+02	7.6E+03	--	--	1.7E+00	6.9E+01	--	--	1.9E+01	7.6E+02	--	--	**1.9E+01**	**7.6E+02**
N-Nitrosodimethylamine[C]	0	--	--	6.9E-03	3.0E+01	--	--	2.1E-01	9.3E+02	--	--	6.9E-04	3.0E+00	--	--	2.1E-02	9.3E+01	--	--	**2.1E-02**	**9.3E+01**
N-Nitrosodiphenylamine[C]	0	--	--	3.3E+01	6.0E+01	--	--	1.0E+03	1.9E+03	--	--	3.3E+00	6.0E+00	--	--	1.0E+02	1.9E+02	--	--	**1.0E+02**	**1.9E+02**
N-Nitrosodi-n-propylamine[C]	0	--	--	5.0E-02	5.1E+00	--	--	1.6E+00	1.6E+02	--	--	5.0E-03	5.1E-01	--	--	1.6E-01	1.6E+01	--	--	**1.6E-01**	**1.6E+01**
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.1E+02	5.5E+01	--	--	7.0E+00	1.7E+00	--	--	5.4E+01	1.4E+01	--	--	**5.4E+01**	**1.4E+01**	--	--
Parathion	0	6.5E-02	1.3E-02	--	--	5.0E-01	1.1E-01	--	--	1.6E-02	3.3E-03	--	--	1.2E-01	2.7E-02	--	--	**1.2E-01**	**2.7E-02**	--	--
PCB Total[C]	0	--	1.4E-02	6.4E-04	6.4E-04	--	1.2E-01	2.0E-02	2.0E-02	--	3.5E-03	6.4E-05	6.4E-05	--	2.9E-02	2.0E-03	2.0E-03	--	**2.9E-02**	**2.0E-03**	**2.0E-03**
Pentachlorophenol [C]	0	7.8E+00	6.1E+00	2.7E+00	3.0E+01	5.9E+01	5.1E+01	8.4E+01	9.3E+02	1.9E+00	1.5E+00	2.7E-01	3.0E+00	1.5E+01	1.3E+01	8.4E+00	9.3E+01	**1.5E+01**	**1.3E+01**	**8.4E+00**	**9.3E+01**
Phenol	0	--	--	1.0E+04	8.6E+05	--	--	1.1E+05	9.5E+06	--	--	1.0E+03	8.6E+04	--	--	1.1E+04	9.5E+05	--	--	**1.1E+04**	**9.5E+05**
Pyrene	0	--	--	8.3E+02	4.0E+03	--	--	9.1E+03	4.4E+04	--	--	8.3E+01	4.0E+02	--	--	9.1E+02	4.4E+03	--	--	**9.1E+02**	**4.4E+03**
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gross Alpha Activity (pCi/L)	0	--	--	1.5E+01	--	--	--	1.7E+02	--	--	--	1.5E+00	--	--	--	1.7E+01	--	--	--	**1.7E+01**	--
Beta and Photon Activity (mrem/yr)	0	--	--	4.0E+00	4.0E+00	--	--	4.4E+01	4.4E+01	--	--	4.0E-01	4.0E-01	--	--	4.4E+00	4.4E+00	--	--	**4.4E+00**	**4.4E+00**
Radium 226 + 228 (pCi/L)	0	--	--	5.0E+00	--	--	--	5.5E+01	--	--	--	5.0E-01	--	--	--	5.5E+00	--	--	--	**5.5E+00**	--
Uranium (ug/l)	0	--	--	3.0E+01	--	--	--	3.3E+02	--	--	--	3.0E+00	--	--	--	3.3E+01	--	--	--	**3.3E+01**	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	1.7E+02	4.2E+03	1.5E+02	4.2E+01	1.9E+03	4.6E+04	5.0E+00	1.3E+00	1.7E+01	4.2E+02	3.8E+01	1.0E+01	1.9E+02	4.6E+03	**3.8E+01**	**1.0E+01**	**1.9E+02**	**4.6E+03**
Silver	0	5.1E+00	--	--	--	3.9E+01	--	--	--	1.3E+00	--	--	--	9.8E+00	--	--	--	**9.8E+00**	--	--	--
Sulfate	0	--	--	2.5E+05	--	--	--	2.8E+06	--	--	--	2.5E+04	--	--	--	2.8E+05	--	--	--	**2.8E+05**	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	1.7E+00	4.0E+01	--	--	5.3E+01	1.2E+03	--	--	1.7E-01	4.0E+00	--	--	5.3E+00	1.2E+02	--	--	**5.3E+00**	**1.2E+02**
Tetrachloroethylene[C]	0	--	--	6.9E+00	3.3E+01	--	--	2.1E+02	1.0E+03	--	--	6.9E-01	3.3E+00	--	--	2.1E+01	1.0E+02	--	--	**2.1E+01**	**1.0E+02**
Thallium	0	--	--	2.4E-01	4.7E-01	--	--	2.6E+00	5.2E+00	--	--	2.4E-02	4.7E-02	--	--	2.6E-01	5.2E-01	--	--	**2.6E-01**	**5.2E-01**
Toluene	0	--	--	5.1E+02	6.0E+03	--	--	5.6E+03	6.6E+04	--	--	5.1E+01	6.0E+02	--	--	5.6E+02	6.6E+03	--	--	**5.6E+02**	**6.6E+03**
Total dissolved solids	0	--	--	5.0E+05	--	--	--	5.5E+06	--	--	--	5.0E+04	--	--	--	5.5E+05	--	--	--	**5.5E+05**	--
Toxaphene [C]	0	7.3E-01	2.0E-04	2.8E-03	2.8E-03	5.6E+00	1.7E-03	8.7E-02	8.7E-02	1.8E-01	5.0E-05	2.8E-04	2.8E-04	1.4E+00	4.2E-04	8.7E-03	8.7E-03	**1.4E+00**	**4.2E-04**	**8.7E-03**	**8.7E-03**
Tributyltin	0	4.6E-01	7.2E-02	--	--	3.5E+00	6.0E-01	--	--	1.2E-01	1.8E-02	--	--	8.8E-01	1.5E-01	--	--	**8.8E-01**	**1.5E-01**	--	--
1,2,4-Trichlorobenzene	0	--	--	3.5E+01	7.0E+01	--	--	3.9E+02	7.7E+02	--	--	3.5E+00	7.0E+00	--	--	3.9E+01	7.7E+01	--	--	**3.9E+01**	**7.7E+01**
1,1,2-Trichloroethane[C]	0	--	--	5.9E+00	1.6E+02	--	--	1.8E+02	5.0E+03	--	--	5.9E-01	1.6E+01	--	--	1.8E+01	5.0E+02	--	--	**1.8E+01**	**5.0E+02**
Trichloroethylene [C]	0	--	--	2.5E+01	3.0E+02	--	--	7.8E+02	9.3E+03	--	--	2.5E+00	3.0E+01	--	--	7.8E+01	9.3E+02	--	--	**7.8E+01**	**9.3E+02**
2,4,6-Trichlorophenol [C]	0	--	--	1.4E+01	2.4E+01	--	--	4.3E+02	7.4E+02	--	--	1.4E+00	2.4E+00	--	--	4.3E+01	7.4E+01	--	--	**4.3E+01**	**7.4E+01**
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	5.0E+01	--	--	--	5.5E+02	--	--	--	5.0E+00	--	--	--	5.5E+01	--	--	--	**5.5E+01**	--
Vinyl Chloride[C]	0	--	--	2.5E-01	2.4E+01	--	--	7.8E+00	7.4E+02	--	--	2.5E-02	2.4E+00	--	--	7.8E-01	7.4E+01	--	--	**7.8E-01**	**7.4E+01**
Zinc	0	1.4E+02	1.4E+02	7.4E+03	2.6E+04	1.1E+03	1.2E+03	8.1E+04	2.9E+05	3.6E+01	3.6E+01	7.4E+02	2.6E+03	2.7E+02	3.0E+02	8.1E+03	2.9E+04	**2.7E+02**	**3.0E+02**	**8.1E+03**	**2.9E+04**

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.2E+00
Arsenic	1.1E+01
Barium	2.2E+03
Cadmium	1.7E+00
Chromium III	1.1E+02
Chromium VI	1.2E+01
Copper	1.3E+01
Iron	3.3E+02
Lead	1.7E+01
Manganese	5.5E+01
Mercury	9.6E-01
Nickel	3.1E+01
Selenium	6.3E+00
Silver	3.9E+00
Zinc	1.1E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

0.015 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD 0.015

	Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.100	0.230	0.115	0.245
7Q10	0.110	N/A	0.125	N/A
30Q10	0.130	0.390	0.145	0.405
30Q5	0.150	N/A	0.165	N/A
Harm. Mean	0.450	N/A	0.465	N/A
Annual Avg.	0.000	N/A	0.015	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	24.200	12.600
30Q10 90th% Temp. Mix (deg C)	24.200	12.600
1Q10 90th% pH Mix (SU)	7.917	8.005
30Q10 90th% pH Mix (SU)	7.949	8.040
1Q10 10th% pH Mix (SU)	6.882	N/A
7Q10 10th% pH Mix (SU)	6.910	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3)	126.0	126.0
7Q10 Hardness (mg/L as CaCO3)	126.0	126.0

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.917
(7.204 - pH)	-0.713
(pH - 7.204)	0.713
Trout Present Criterion (mg N/l	6.555
Trout Absent Criterion (mg N/L	9.814
Trout Present?	n
Effective Criterion (mg N/L)	9.814

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	24.200
90th Percentile pH (SU)	7.949
MIN	1.527
MAX	24.200
(7.688 - pH)	-0.261
(pH - 7.688)	0.261
Early LS Present Criterion (mg N	1.401
Early LS Absent Criterion (mg N/	1.401
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.401

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.005
(7.204 - pH)	-0.801
(pH - 7.204)	0.801
Trout Present Criterion (mg N/l	5.566
Trout Absent Criterion (mg N/L	8.335
Trout Present?	n
Effective Criterion (mg N/L)	8.335

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	12.600
90th Percentile pH (SU)	8.040
MIN	2.850
MAX	12.600
(7.688 - pH)	-0.352
(pH - 7.688)	0.352
Early LS Present Criterion (mg N	2.296
Early LS Absent Criterion (mg N/	2.598
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.296

0.015 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD 0.015

	100% Stream Flows Allocated to Mix (MGD)		Total Mix Flows Stream + Discharge (MGD)	
	Dry Season	Wet Season	Dry Season	Wet Season
1Q10	0.100	0.230	0.115	0.245
7Q10	0.110	N/A	0.125	N/A
30Q10	0.130	0.390	0.145	0.405
30Q5	0.150	N/A	0.165	N/A
Harm. Mean	0.450	N/A	0.465	N/A
Annual Avg.	0.000	N/A	0.015	N/A

Stream/Discharge Mix Values

	Dry Season	Wet Season
1Q10 90th% Temp. Mix (deg C)	24.200	12.600
30Q10 90th% Temp. Mix (deg C)	24.200	12.600
1Q10 90th% pH Mix (SU)	7.917	8.005
30Q10 90th% pH Mix (SU)	7.949	8.040
1Q10 10th% pH Mix (SU)	6.882	N/A
7Q10 10th% pH Mix (SU)	6.910	N/A

	Calculated	Formula Inputs
1Q10 Hardness (mg/L as CaCO3) =	126.000	126.000
7Q10 Hardness (mg/L as CaCO3) =	126.000	126.000

Ammonia - Dry Season - Acute

90th Percentile pH (SU)	7.917
(7.204 - pH)	-0.713
(pH - 7.204)	0.713
Trout Present Criterion (mg N/l	6.555
Trout Absent Criterion (mg N/L	9.814
Trout Present?	n
Effective Criterion (mg N/L)	9.814

Ammonia - Dry Season - Chronic

90th Percentile Temp. (deg C)	24.200
90th Percentile pH (SU)	7.949
MIN	1.527
MAX	24.200
(7.688 - pH)	-0.261
(pH - 7.688)	0.261
Early LS Present Criterion (mg N	1.401
Early LS Absent Criterion (mg N/	1.401
Early Life Stages Present?	y
Effective Criterion (mg N/L)	1.401

Ammonia - Wet Season - Acute

90th Percentile pH (SU)	8.005
(7.204 - pH)	-0.801
(pH - 7.204)	0.801
Trout Present Criterion (mg N/l	5.566
Trout Absent Criterion (mg N/L	8.335
Trout Present?	n
Effective Criterion (mg N/L)	8.335

Ammonia - Wet Season - Chronic

90th Percentile Temp. (deg C)	12.600
90th Percentile pH (SU)	8.040
MIN	2.850
MAX	12.600
(7.688 - pH)	-0.352
(pH - 7.688)	0.352
Early LS Present Criterion (mg N	2.296
Early LS Absent Criterion (mg N/	2.598
Early Life Stages Present?	y
Effective Criterion (mg N/L)	2.296

Mixing Zone Predictions for Tanglewood Home for Adults (Perennial - Low Flow)

Effluent Flow = 0.018 MGD
Stream 7Q10 = 0.11 MGD
Stream 30Q10 = 0.13 MGD
Stream 1Q10 = 0.10 MGD
Stream slope = 0.007 ft/ft
Stream width = 2.68 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .2399 ft
Length = 15.87 ft
Velocity = .3081 ft/sec
Residence Time = .0006 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .2633 ft
Length = 14.53 ft
Velocity = .3246 ft/sec
Residence Time = .0005 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2273 ft
Length = 16.71 ft
Velocity = .2992 ft/sec
Residence Time = .0155 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Mixing Zone Predictions for Tanglewood Manor (Perennial - High Flow)

Effluent Flow = 0.018 MGD
Stream 7Q10 = 0.27 MGD
Stream 30Q10 = 0.39 MGD
Stream 1Q10 = 0.23 MGD
Stream slope = 0.007 ft/ft
Stream width = 3.9 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .3095 ft
Length = 27.49 ft
Velocity = .3693 ft/sec
Residence Time = .0009 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .386 ft
Length = 22.38 ft
Velocity = .4189 ft/sec
Residence Time = .0006 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .2815 ft
Length = 29.99 ft
Velocity = .3496 ft/sec
Residence Time = .0238 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

4/27/2015 10:07:36 AM

Facility = Tanglewood Home for Adults WWTP
Chemical = ammonia (mg/L) June - Dec.
Chronic averaging period = 30
WLAa = 19
WLAc = 2.5
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 5.04417523354078
Average Weekly limit = 5.04417523354078
Average Monthly LImit = 5.04417523354078

The data are:

9

4/27/2015 10:04:19 AM

Facility = Tanglewood Home for Adults WWTP
Chemical = ammonia (mg/L) Jan. - May
Chronic averaging period = 30
WLAa = 23
WLAc = 4.7
Q.L. = 0.2
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 9.48304943905666
Average Weekly limit = 9.48304943905666
Average Monthly LImit = 9.48304943905666

The data are:

9

4/27/2015 10:13:16 AM

Facility = Tanglewood Home for Adults WWTP
Chemical = TRC (mg/L)
Chronic averaging period = 4
WLAa = 0.19
WLAc = 0.011
Q.L. = 0.1
# samples/mo. = 30
# samples/wk. = 8

Summary of Statistics:

observations = 1
Expected Value = 1000
Variance = 360000
C.V. = 0.6
97th percentile daily values = 2433.41
97th percentile 4 day average = 1663.79
97th percentile 30 day average= 1206.05
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 1.60883226245855E-02
Average Weekly limit = 9.59676626920106E-03
Average Monthly LImit = 7.9737131838758E-03

The data are:

1000

COMMONWEALTH of VIRGINIA

E. ANNE PETERSON, M.D., M.P.H.
STATE HEALTH COMMISSIONER

Department of Health
Division of Wastewater Engineering
West Central Area

P.O. Box 21534
ROANOKE, VIRGINIA 24018
Phone (540) 562-3500
Fax (540) 562-3661
email mdegen@vdh.state.va.us

September 19, 2001

SUBJECT: Alleghany County
Sewerage – Tanglewood Manor
VPDES Draft Permit VA0090646

Becky France
Department of Environmental Quality
3019 Peters Creek Road
Roanoke, VA 24019

Dear Ms. France:

As a result of information that was obtained during the August 15, 2001, public hearing for this permit action, it is this Department's understanding that the permit limitations are being redrafted to reflect a 7Q10 flow of zero in the receiving stream. The hearing also provided citizen documentation of their intimate contact with the stream for recreational purposes immediately downstream of the proposed discharge. Given this information, the Virginia Department of Health (VDH) is recommending that in addition to the existing total residual chlorine limit at the end of the chlorine contact tank of 1.5 mg/l with daily monitoring, that a fecal coliform limit of 20 colonies per 100 milliliters is appropriate. This tenfold factor of safety on the fecal coliform limit is necessary to protect human health given the lack of dilution and the potential for human contact with the effluent. However, VDH agrees that the current total residual chlorine limitations (i.e. 1.5 mg/l following a minimum 30 minutes of contact time) will achieve at least the 20 colonies per 100 milliliters criterion. VDH recommends that monitoring for this reduced fecal coliform limit be imposed if an alternative disinfection method is used or if the facility fails to meet the 1.5 mg/l total residual chlorine requirement.

VDH Working Memo 686, the basis for the VDH comments, was developed from committee work done in the late 1980s and early '90s aimed at single family discharges. VDH indicated that the 200 colonies per 100 milliliters recommendation, which became the basis for Virginia's water quality standard, was fundamentally based on the presumption of adequate in-stream dilution. It is not defensible from a public health standpoint where there is the potential for human contact and minimal dilution exists. Therefore, where there is insufficient in-stream dilution, the microorganism content in the effluent must be decreased as a measure taken to protect the public health. Downstream use and percent of flow attributable to human sewage are key to VDH's implementation of disinfection requirements, and each discharge is independently addressed according to the specifics of the site. The VDH is applying specific recommendations based on the characteristics of this particular site.

VDH previously recommended a Reliability Class I and a Class IV licensed operator and continues to recommend this as Reliability Class I greatly reduces the potential for failure and a licensed operator greatly improves the performance of the system. This remains a VDH requirement and should be maintained in the revised VPDES draft permit.

Sincerely,

Marcia J. Degen

Marcia J. Degen, Ph.D., P.E.
West Central Area Engineer
Division of Wastewater Engineering

Cc: Dr. Molly O'Dell, Health Director – Alleghany Health District
Mr. Dick Tabb, Environmental Health Manager – Alleghany Health District
Alleghany County Health Department
VDH/DWSE – Lexington Environmental Engineering Field Office
VDH – Division of Wastewater Engineering

France,Becky

From: Degen,Marcia
Sent: Thursday, December 08, 2005 4:20 PM
To: France,Becky
Subject: RE: Message from France,Becky

Becky,

Got your message. I'd forgotten that we put that more stringent fecal limit on Tanglewood in response to the public comment.

My only thought is to use the same ratio that they used to set the 126 from 200. Using that I get 12.6 or round up to 13 (or down to 12, I forget which).

Unfortunately, that's all I've got to offer.
Marcia

-----Original Message-----
From: France,Becky
Sent: Thu 12/8/2005 10:11 AM
To: Degen,Marcia
Cc:
Subject: Message from France,Becky

Attachment H

Regional Water Quality Model (Version 4.0)

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to OGLE CREEK.

File Information

File Name:	C:\Users\Becky\Desktop\Tanglewood low flow mod 2015 m.mod
Date Modified:	April 27, 2015

Water Quality Standards Information

Stream Name:	OGLE CREEK
River Basin:	James River Basin
Section:	12i
Class:	IV - Mountainous Zones Waters
Special Standards:	PWS

Background Flow Information

Gauge Used:	Flow Frequency - Dunlap Creek
Gauge Drainage Area:	0.00011 Sq.Mi.
Gauge 7Q10 Flow:	0 MGD
Headwater Drainage Area:	0 Sq.Mi.
Headwater 7Q10 Flow:	0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	24.2 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.22859 mg/l

Model Segmentation

Number of Segments:	2
Model Start Elevation:	1400 ft above MSL
Model End Elevation:	1361 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to OGLE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	TANGLEWOOD MANOR
VPDES Permit No.:	VA0090646

Discharger Flow Information

Flow:	0.018 MGD
cBOD5:	15 mg/l
TKN:	5.1 mg/l
D.O.:	6.5 mg/l
Temperature:	24.2 Degrees C

Geographic Information

Segment Length:	0.955 miles
Upstream Drainage Area:	0.00001 Sq.Mi.
Downstream Drainage Area:	0.0001 Sq.Mi.
Upstream Elevation:	1400 Ft.
Downstream Elevation:	1367 Ft.

Hydraulic Information

Segment Width:	1.85 Ft.
Segment Depth:	0.096 Ft.
Segment Velocity:	0.157 Ft./Sec.
Segment Flow:	0.018 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to OGLE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	

Tributary Flow Information

Flow:	0.28 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	7.238 mg/l
Temperature:	24.2 Degrees C

Geographic Information

Segment Length:	0.28 miles
Upstream Drainage Area:	2.57 Sq.Mi.
Downstream Drainage Area:	13.03 Sq.Mi.
Upstream Elevation:	1367 Ft.
Downstream Elevation:	1361 Ft.

Hydraulic Information

Segment Width:	2.68 Ft.
Segment Depth:	0.515 Ft.
Segment Velocity:	0.327 Ft./Sec.
Segment Flow:	0.298 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	None

"Model Run For C:\Users\Becky\Desktop\Tanglewood low flow mod 2015 m.mod On 4/27/2015 10:53:01 AM"

"Model is for OGLE CREEK."
"Model starts at the TANGLEWOOD MANOR discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, 7.229, 24.2

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.018, 15, 5.1, ,6.5, 24.2

"Hydraulic Information for Segment 1"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.955, 1.85, .096, .157

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.018, 6.5, 37.5, 9.093, 8.037, 24.2

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1.4, 1.698, 20, 22.095, .5, .691, 0, 0

"Output for Segment 1"
"Segment starts at TANGLEWOOD MANOR"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 6.5, 37.5, 9.093
.1, .1, 5.624, 35.102, 8.852
.2, .2, 5.36, 32.857, 8.617
.3, .3, 5.348, 30.756, 8.388
.4, .4, 5.437, 28.789, 8.165
.5, .5, 5.562, 26.948, 7.948
.6, .6, 5.698, 25.225, 7.737
.7, .7, 5.833, 23.612, 7.532
.8, .8, 5.962, 22.102, 7.332
.9, .9, 6.085, 20.689, 7.137
.955, .955, 6.15, 19.95, 7.032

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.28, 2, 0, ,7.238, 24.2

"Incremental Flow Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, ,7.238, 24.2

"Hydraulic Information for Segment 2"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.28, 2.68, .515, .327

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.298, 7.172, 5.903, .425, 8.042, 24.2

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.5, .606, 12.857, 14.204, .25, .345, 0, 0

"Output for Segment 2"
"Segment starts at "
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
.955, 0, 7.172, 5.903, .425
1.055, .1, 7.238, 5.836, .422
1.155, .2, 7.238, 5.77, .419
1.235, .28, 7.238, 5.718, .417

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to OGLE CREEK.

File Information

File Name:	C:\Users\Becky\Desktop\Tanglewood high flow 2015m.mod
Date Modified:	April 27, 2015

Water Quality Standards Information

Stream Name:	OGLE CREEK
River Basin:	James River Basin
Section:	12i
Class:	IV - Mountainous Zones Waters
Special Standards:	PWS

Background Flow Information

Gauge Used:	Flow Frequency - Dunlap Creek
Gauge Drainage Area:	0.00011 Sq.Mi.
Gauge 7Q10 Flow:	0 MGD
Headwater Drainage Area:	0 Sq.Mi.
Headwater 7Q10 Flow:	0 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	12.6 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	9.081294 mg/l

Model Segmentation

Number of Segments:	2
Model Start Elevation:	1400 ft above MSL
Model End Elevation:	1361 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to OGLE CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	TANGLEWOOD MANOR
VPDES Permit No.:	VA0090646

Discharger Flow Information

Flow:	0.018 MGD
cBOD5:	24 mg/l
TKN:	9 mg/l
D.O.:	5.6 mg/l
Temperature:	12.6 Degrees C

Geographic Information

Segment Length:	0.955 miles
Upstream Drainage Area:	0 Sq.Mi.
Downstream Drainage Area:	0.0001 Sq.Mi.
Upstream Elevation:	1400 Ft.
Downstream Elevation:	1367 Ft.

Hydraulic Information

Segment Width:	1.85 Ft.
Segment Depth:	0.096 Ft.
Segment Velocity:	0.157 Ft./Sec.
Segment Flow:	0.018 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge to OGLE CREEK.

Segment Information for Segment 2

Definition Information

Segment Definition:	A tributary enters.
Tributary Name:	THORNY BRANCH

Tributary Flow Information

Flow:	0.28 MGD
cBOD5:	2 mg/l
TKN:	0 mg/l
D.O.:	9.093 mg/l
Temperature:	12.6 Degrees C

Geographic Information

Segment Length:	0.17 miles
Upstream Drainage Area:	2.57 Sq.Mi.
Downstream Drainage Area:	13.03 Sq.Mi.
Upstream Elevation:	1367 Ft.
Downstream Elevation:	1361 Ft.

Hydraulic Information

Segment Width:	3.91 Ft.
Segment Depth:	0.321 Ft.
Segment Velocity:	0.343 Ft./Sec.
Segment Flow:	0.298 MGD
Incremental Flow:	0 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Large Rock
Sludge:	None
Plants:	None
Algae:	None

"Model Run For C:\Users\Becky\Desktop\Tanglewood high flow 2015m.mod On 4/27/2015 10:50:39 AM"

"Model is for OGLE CREEK."
"Model starts at the TANGLEWOOD MANOR discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, 9.081, 12.6

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.018, 24, 9, ,5.6, 12.6

"Hydraulic Information for Segment 1"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.955, 1.85, .096, .157

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.018, 5.6, 60, 25.98, 10.096, 12.6

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
2, 1.424, 20, 16.781, .6, .339, 0, 0

"Output for Segment 1"
"Segment starts at TANGLEWOOD MANOR"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 5.6, 60, 25.98
.1, .1, 5.138, 56.765, 25.639
.2, .2, 5.029, 53.705, 25.302
.3, .3, 5.096, 50.81, 24.97
.4, .4, 5.248, 48.071, 24.642
.5, .5, 5.439, 45.479, 24.319
.6, .6, 5.644, 43.027, 24
.7, .7, 5.85, 40.707, 23.685
.8, .8, 6.052, 38.512, 23.374
.9, .9, 6.247, 36.436, 23.067
.955, .955, 6.35, 35.342, 22.9

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.28, 2, 0, ,9.093, 12.6

"Incremental Flow Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 2, 0, ,9.093, 12.6

"Hydraulic Information for Segment 2"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.17, 3.91, .321, .343

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.298, 8.927, 6.833, 1.383, 10.104, 12.6

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, .712, 20, 16.781, .45, .255, 0, 0

"Output for Segment 2"
"Segment starts at THORNY BRANCH"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
.955, 0, 8.927, 6.833, 1.383
1.055, .1, 9.093, 6.747, 1.377
1.125, .17, 9.093, 6.687, 1.373

"END OF FILE"

Attachment I

Public Notice

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Alleghany County.
PUBLIC COMMENT PERIOD: September 3, 2015 through October 2, 2015
PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board
APPLICANT NAME, ADDRESS, AND PERMIT NUMBER: Tanglewood Home for Adults WWTP, PO Box 808, Covington, Virginia 24426, VA0090646
FACILITY NAME AND LOCATION: Tanglewood Home for Adults WWTP, 4401 Midland Trail (VA Route 661)
PROJECT DESCRIPTION: Tanglewood Home for Adults WWTP has applied for a reissuance of a permit for the public wastewater treatment plant. The applicant proposes to release treated sewage wastewater at a rate of 18,000 gallons per day from the current facility into a water body. The facility proposes to release the treated sewage into Ogle Creek in Alleghany County in the Ogle Creek Watershed (VAW-I08R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: organic matter, solids, toxic pollutants, nutrients
HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for a public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if a public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.
CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION: Becky L. France; ADDRESS: Virginia Department of Environmental Quality, Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; (540) 562-6700; E-MAIL ADDRESS: becky.france@deq.virginia.gov; FAX: (540) 562-6725. The public may review the draft permit and application at the DEQ office named above by appointment or may request copies of the documents from the contact person listed above.